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JOURNAL OF EDUCATIONAL RESEARCH

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JOURNAL *of* EDUCATIONAL RESEARCH

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SOURCES OF SUPERSTITIOUS BELIEFS

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Purpose of Study.—The purpose of the present investigation was to study the individual sources of superstitious beliefs, the social and educational factors that contribute toward the learning and unlearning of unfounded ideas.[1] The questions to be answered were: To what extent is the home a source of belief and disbelief in superstitions? What is the contribution of books and newspapers, school and church, friends and personal observation? It is obvious that only through knowledge of the "breeding places" of superstition, and of the sources of unfounded beliefs, will it be possible to attempt remedial work in this important phase of social and cultural education.

The rational connection between cause and effect is at the very origin of scientific thinking. A superstitious belief is one that ascribes causal relationship to phenomena and objects which bear no such relationship to one another.

The origin of many superstitions which appear to be inexplicable has been traced by students of folk-lore. In some instances it is difficult to separate superstitious beliefs and practices from certain religious beliefs and practices. Superstition is often defined as false religion. In view of the enormous differences in opinion as to what constitutes correct and false religion, it is not altogether surprising that what is considered religion by one may be considered superstition by another.

General descriptions of the nature of superstition and its distinction from religion and philosophy are found in the writings of ancient philosophers. Theophrastus (about 300 B.C.) described the Superstitious Man in one of his famous character sketches and thereby laid the founda-

[1] The writers wish to acknowledge their indebtedness to Dr. Otis W. Caldwell, Director of the Institute of School Experimentation for his kind coöperation that made the study possible.

tion of the descriptive approach to the study of superstition and the superstitious.

A classic analysis of the various types of unfounded beliefs and their sources is found in the writings of Francis Bacon. In his *Novum Organum* we find the following classification of superstitions or idols: "The idols of the tribe are inherent in human nature . . .; for man's sense is falsely asserted to be standard of things; on the contrary, all the perceptions both of the senses and the mind bear reference to man and not to the universe, and the human mind resembles those uneven mirrors which impart their own properties to different objects, from which rays are emitted and distort and disfigure them.

"The idols of the den are those of each individual; for everybody... has his own individual den or cavern, which intercepts and corrupts the light of nature, either from his own peculiar and singular disposition or from his education and intercourse with others, or from his reading, and the authority acquired by those whom he reverences and admires, or from the different impressions produced on the mind, as it happens to be preoccupied and predisposed...

"There are also idols formed by the reciprocal intercourse and society of man with man which we call idols of the market from the commerce and association of men with each other...

"Lastly, there are idols which have crept into men's minds from the various dogmas of peculiar systems of philosophy, and also from the perverted rules of demonstration."

Of the numerous studies in this field, the great majority are devoted either to a description of the various kinds of superstitions and their origin or to mere compilation of folk beliefs and superstitions current among people of various national and cultural groups. A few studies have endeavored to investigate the degree of prevalence of belief in unfounded ideas. Lists of such ideas were presented to large numbers of individuals with a request to indicate for each idea whether or not they believed in it. Some of the studies dealt also with sex differences in superstitious beliefs, differences between city and country people, and differences between individuals of different social levels or different national groups. In some instances the correlations between superstitious beliefs and chronological age, intelligence, and scholarship have been determined.

Before proceeding with the description of the method and procedure of the present investigation, a summary will be presented of the findings

of some outstanding studies in the field concerning the prevalence of superstitious beliefs, the factors correlated with such beliefs, and the attempts at correcting unfounded beliefs through instruction.

Previous Studies on the Prevalence of Superstitions.—Few studies in the field of superstitions were based on an unselected population. Most of the studies deal with high-school and college students. The studies of the Committee on Experimental Psychology[2] and Frank[3] dealt with a relatively unselected population. The findings of these studies indicate that superstitious belief and practice exist among all classes of society and to some degree even among students of higher education.

Gould[4] made an investigation among normal-school students of the University of Edinburgh, Scotland. The recall method was used, that is, the students were asked to record during a period of 15 minutes, as many superstitions as they could recall. They were asked to indicate also those which influenced or affected their conduct. Superstitious belief or practice was admitted by 44.9 percent of the students included in the study. Conklin[5] found that college freshmen believed or practiced 53 percent of the superstitious ideas included in a questionnaire. Caldwell and Lundeen[6] in their study of attitudes regarding unfounded beliefs report that high-school seniors had heard of 50 percent of the 200 ideas included in the study; believed 20.1 percent; and were affected by 22.6 percent of those which they had heard.

Sex difference: The study conducted by the Committee on Experimental Psychology[7] in the year 1887 revealed that women are more superstitious than men. This finding has been corroborated by subse-

[2] "First Report of the Committee on Experimental Psychology," *Proceedings of American Society for Psychical Research*, I, No. 3, 1887. A questionnaire study limited to three superstitions.

[3] Frank, J. O. "Superstitions and Science Teaching," *School Science and Mathematics*, XXX (March, 1930), pp. 277-282. A study of superstitions in the Fox River Valley of Wisconsin. A list of the most common superstitions of the region is presented in this article.

[4] Gould, R. L. "Superstitions Among Scottish College Girls," *Pedagogical Seminary*, XXVIII (1921), pp. 203-248. A scientific study of superstitions of 377 college girls and 7 college men, in the psychology department in the normal school in connection with the University of Edinburgh, Scotland. A classified list of 967 different superstitions is presented.

[5] Conklin, E. S. "Superstitious Belief and Practice Among College Students," *American Journal of Psychology*, XXX (1919), pp. 83-102. A questionnaire study among psychology students of the University of Oregon.

[6] Caldwell, Otis W., and Lundeen, G. E. "Students' Attitudes Regarding Unfounded Beliefs," *Science Education*, May, 1931.

[7] See footnote 2.

quent investigations. Nixon's[8] report indicates that college women are more superstitious than are college men. Garrett and Fisher's[9] questionnaire, similar to that of Nixon, was given to high-school seniors. The results showed that girls marked more misconceptions *true* than did the boys. Conklin[10] in a study of "Superstitious Belief and Practice among College Students" asked the students to state superstitions which they believed or which had an influence upon their conduct. They were also asked to record superstitions which they formerly believed and which formerly had influenced their conduct. A larger percent of the women admitted superstitious belief and practice than of the men. Women, also, mentioned slightly more superstitions on the average than did the men. Wagner's[11] report reveals a similar sex difference, women being the more superstitious. The recent findings of Lundeen and Caldwell[12] support those of previous studies; high school girls and college women have heard, believe in, and are influenced by a greater number of unfounded beliefs than are high-school boys and college men.

Influence of environment: Gould[13] found that the students who had received their previous training in rural communities and presumably had been reared in rural districts, recalled a greater number of superstitions and were, also, affected by them to a greater degree than were students from large cities. Wagner[14] in a study of 186 students, some of whom received their high school education in small towns and others in large cities, found no difference between these groups in the prevalence of superstitions. Lundeen and Caldwell[15] in a study based on nine hundred eighteen cases found that high school seniors of rural communities

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[8] Nixon, H. K. "Popular Answers to Some Psychological Questions," *American Journal of Psychology*, XXXVI (1925), pp. 418-423. A questionnaire study among college students in the elementary psychology classes in the extension division of Columbia and New York Universities.

[9] Garrett, H. E., and Fisher, T. H. "The Prevalence of Certain Popular Misconceptions," *Journal of Applied Psychology*, X (1926), pp. 411-421. A questionnaire study among high school seniors of New York City.

[10] Conklin, E. S. *ibid.*

[11] Wagner, M. E. "Superstitions and their Social and Psychological Correlatives Among College Students," *Journal of Educational Sociology*, II (September, 1928), pp. 26-36. An important study among 186 college freshmen.

[12] Lundeen, G. E., and Caldwell, Otis W. "A Study of Unfounded Beliefs Among High School Seniors," *Journal of Educational Research*, XXII (November, 1930), pp. 257-273. The findings among 918 pupils are presented. College students are also included for the purpose of comparison.

[13] Gould, R. L. *ibid.*

[14] Wagner, M. E. *ibid.*

[15] Lundeen, G. E., and Caldwell, Otis W. *ibid.*

have heard, believe in, and are influenced by a greater number of superstitions than high school seniors of large cities.

Superstition and age: According to the findings of Caldwell and Lundeen,[16] college students are familiar with a greater number of superstitions than are high-school pupils, but they believe in, and are influenced by a smaller number of those ideas. The correlation between age and the number of ideas "heard" among 120 graduate students was .325 ± .06. Similarly, a positive but low correlation was found between age and the number of ideas "heard" among high-school seniors. The correlation between the ideas "believed" or "influenced" and age was practically zero both among high-school and college students. Garrett and Fisher,[17] after comparing the results of their study of high-school seniors with the study of Nixon, concluded that high-school boys and girls are inclined to be more superstitious than adults. Wagner[18] reports a correlation of —.19 between age and belief among 186 college students. While information concerning superstitions increases with age, belief in superstitious ideas appears to decrease with age.

Superstition and intelligence: Wagner found a correlation of —.12 between belief in superstitions and intelligence. Garrett and Fisher's findings indicate practically no correlation between psychological misconceptions and intelligence. R. T. Fisher[19] found that the correlation between belief in misconceptions and intelligence was negligible. The results of Gilliland[20] indicate a negative correlation between misconceptions and scholarship. Further investigation is needed to determine the relationship between superstitiousness and intelligence.

Effect of instruction: A few experimental studies in regard to the effect of instruction upon superstition and other unfounded beliefs have been made. Smith[21] found that the study of science decreases belief in

[16] See footnote 6.

[17] Garrett, H. E., and Fisher, T. R. *ibid.*

[18] Wagner, M. E. *ibid.*

[19] Fisher, R. T. *The Prevalence of Superstitious Beliefs*, Master's Thesis, Faculty of Philosophy, Columbia University, May, 1926.

[20] Gilliland, A. R. "A Study of the Superstitions of College Students," *Journal of Abnormal and Social Psychology*, XXIV (January-March, 1930), pp. 472-479. This article gives a report of the results of a study of the effects of a course in general psychology upon some common superstitions. A modified form of Nixon's test was used.

[21] Smith, V. C. "Science Methods and Superstitions," *School and Society*, XXXI (January, 1930), pp. 66-68. An experimental study giving results of the value of laboratory work in general science and the effect of studying science on superstitions.

superstition. The results of the study of Caldwell and Lundeen[22] indicate that proper attitudes regarding unfounded beliefs may be developed by specific instruction. Studies by Gilliland[23] and by Lehman and Fenton[24] present the effect of a course in psychology on psychological misconceptions. Their results show that misconceptions of a psychological nature were materially reduced after taking a course in psychology.

Other findings: Conklin[25] reports that superstitions regarding domestic and social affairs were found to be more prevalent among women, while superstitions in matters of sports and business activities were more prevalent among men. Wagner[26] reports a correlation of .285 between superstition and suggestibility. Dudycha,[27] Lundeen and Caldwell[28] and other investigators found that misconceptions relating to phrenology, palmistry, telepathy and the like were more prevalent than "pure superstitions." Garrett and Fisher[29] found that the order of prevalence regarding various misconceptions among boys and girls was practically identical with the order found by Nixon among men and women.

Only one of the previous studies, that of Conklin, dealt with the sources of superstitions. That study was based on a questionnaire filled out by 557 college students. According to that study, 84 out of one hundred students questioned attribute their knowledge of superstition to "parents, elders and other social contacts." In view of the general form of the questions and the answers, however, the results are not quite conclusive.

Procedure.—After a careful survey of the literature in the field a series of fifty items dealing with unfounded beliefs was prepared. An attempt was made to select items which have been found in previous studies to be of considerable prevalence. The great majority of the items

[22] Caldwell, Otis W., and Lundeen, Gerhard E. *An Experimental Study of Superstitions and Other Unfounded Beliefs*, New York: Teachers College, Columbia University.

[23] Gilliland, A. R. *ibid.*

[24] Lehman, H. C., and Fenton, N. "Prevalence of Certain Misconceptions and Superstitions among College Students Before and After a Course in Psychology," *Education*, L (April, 1930), pp. 485-494. This article gives the results of a questionnaire of 160 true-false statements given to two groups of college students, beginners and more advanced students in psychology.

[25] Conklin, E. S. *ibid.*

[26] Wagner, M. E. *ibid.*

[27] Dudycha, G. J. "The Moral and Popular Beliefs of College Freshmen," *School and Society*, XXXII (July, 1930), pp. 69-72. This study gives the results of a questionnaire study dealing with 25 popular beliefs and 25 moral propositions given to 98 college freshmen of Ripon College in the fall of 1929.

[28] See footnote 12.

[29] Garrett, H. E., and Fisher, T. R. *ibid.*

consisted of common superstitions such as "Friday the thirteenth is a very unlucky day" or "If you drop a knife or spoon you may expect company."

Several items were included which may be classified as common *misconceptions*. An example of this type of item is the following: "If you stare at a person's back you can make him turn around and look at you." The complete text of the fifty items is given in the Appendix. Unless otherwise indicated, the term "superstitions" will refer to the complete series of items included in this study.

The directions consisted of two parts. First the subjects were directed to read each item and to indicate whether or not they believed it to be true: "Read carefully the statements listed below. If you think the statement is true make a plus sign (+) in the parenthesis in front of it. If you think the statement is not true, mark it minus (−). If you are uncertain about it place a question mark (?) in front of the statement. The following examples are given to make this clear. Example A is marked plus (+) because the statement is true. Example B is marked minus (−) because it is not true.

Example A. (+) The sun is larger than the moon.
Example B. (−) The stars are very small objects."

The second part of the directions dealt with the *sources* of information concerning the various ideas included in the series. The subjects were to indicate for each item whether they had heard it stated as *true* or *false* at home, at school, or at church; from friends, books, newspapers, or from personal observation. The directions read: "You may possibly have been taught certain ideas by one or more of the following: Home, School, Church, Friends, Books, Newspapers, and your Observations. You may have been taught that an idea is true or that it is not true.

"Which of the ideas have you been taught as true? Answer the questions by placing a letter T in the proper column or columns at the right and opposite each statement.

"Which of the ideas have you been taught as not true? Answer the questions by placing the letter F in the proper column or columns at the right.

"Since you may have been taught that an idea is true or false from more than one source you may mark a statement true in some columns and false in others. Here are two examples showing how one pupil answered the statements A and B."

	Home	School	Church	Friends	Books	Newspapers	Observation
(+) A. The sun is larger than the moon		T	T	F	T		T
(−) B. The stars are small objects	T	F		T	F		T

Population.—The present study was based on the complete records of 179 cases. These included 113 pupils of a junior high school in East St. Louis, and 66 pupils of the Western Union Continuation School in New York City. The average age of the former group was 13 and of the latter group 16 years. The younger group was composed of 39 boys and 44 girls. The older group consisted of boys only.

Results Concerning Prevalence of Superstitions.—Although the primary purpose of this research was to study the sources of superstition, the results concerning the prevalence of superstition will also be presented.

1. *General Results.*—The average and variability of the number of superstitions marked *true*, *false* and *uncertain* were determined for the total population, and are shown in Table I. It is seen from Table I that the average pupil marked 13.5 of the ideas as true. This is approximately 27 percent of the total number of ideas included. The average number of ideas considered *false* was 30.2, about 60 percent of the total. The average number of ideas in which the pupil expressed uncertainty was 6.3, or about 13 percent of the total number.

2. *Age Difference.*—The junior high-school boys (age 13) marked a larger number of items true than did the older boys. They, also, marked a smaller number of items false, and a larger number of items as uncertain. The older boys (age 16) marked, on an average, 10.36 items as true, 34.74 as false, and 4.89 as uncertain. The junior high-school boys marked, on an average, 11.53 items as true, 30.23 as false, and 8.23 as uncertain.

The correlation between age and the number of superstitions marked true for the entire population was $-.27 \pm .05$. The correlation between age and the number of superstitions within each of the two groups was negligible. This was due to limited variation within each of the groups.

3. *Sex Difference.*—A comparison was made between junior high-school boys and girls in regard to the nature of their responses. Table II reveals that the average number of items marked true by the boys was 11.53 and by the girls 17.31. This sex difference is statistically signifi-

unt. On an average, the boys marked 30.3 items false, the girls 26.20. The boys were uncertain more frequently than the girls. The average number of items marked *uncertain* was 8.23 and 6.49 respectively.

TABLE I

AVERAGE AND VARIABILITY OF BELIEF IN SUPERSTITIONS

Group	Believed to be True		Believed to be False		Uncertain		N
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Older Boys	10.36	14.79	34.74	11.37	4.89	7.35	66
Junior H.S. Boys	11.53	11.09	30.23	13.89	8.23	11.62	59
Junior H.S. Girls	17.31	9.08	26.20	14.00	6.49	8.96	74
Total Population	13.49	12.33	30.23	13.60	6.28	9.17	179

TABLE II

SEX DIFFERENCE IN RESPONSES TO SUPERSTITIONS

	Mean	S.D.	Difference (Boys-Girls)	D / S.E. (diff.)
	Items Marked True			
Boys	11.53	11.09	—5.78	—2.98
Girls	17.31	9.08		
	Items Marked False			
Boys	30.23	13.89	4.03	1.46
Girls	26.20	14.00		
	Items Marked Uncertain			
Boys	8.23	11.62	1.74	0.82
Girls	6.49	8.96		

4. *Item Analysis.*—The preceding comparisons dealt with the responses regarding superstitions in terms of average and variability of scores. Table III gives the percentage of individuals marking each item true, false, and uncertain. This analysis by individual items is based upon the responses of 100 junior high-school pupils.

This table indicates which items are high and which are low in the prevalence of belief. For example, item 7, "Our winters now are milder than they were 40 or 50 years ago," ranks first in the order of the percentage marking it *true*. Seventy-one percent of the pupils marked this item *true*, 21 percent marked it *false*, and 8 percent expressed uncertainty concerning its correctness. Item 6, "Beavers know by their instinct whether the coming winter will be mild or severe" ranked second in order of belief. The percentage indicating belief was 59. Item 25, "If thirteen individuals are seated at a table one of this number will die within a year," has the lowest rank in the order of prevalence of belief. Only 8 percent indicated that the idea was true while 66 percent marked it false. Next in order is item 43, "If you cross your fingers you can

lie and it won't count." The percent of pupils marking this item true was 11, while 74 percent marked it false.

TABLE III

NATURE OF BELIEF BY INDIVIDUAL ITEMS

Items	BELIEF			Items	BELIEF		
	True	False	Uncertain		True	False	Uncertain
1	43	46	11	26	13	63	24
2	59	25	16	27	46	46	8
3	50	48	2	28	30	58	12
4	40	52	8	29	41	53	6
5	25	55	20	30	35	49	16
6	59	25	16	31	35	50	15
7	71	21	8	32	10	67	23
8	18	46	36	33	12	61	27
9	28	57	15	34	41	49	10
10	39	46	15	35	27	56	17
11	25	61	14	36	26	60	14
12	39	54	7	37	17	59	24
13	46	48	6	38	15	63	22
14	41	49	10	39	34	55	11
15	44	52	4	40	29	56	15
16	28	58	14	41	34	51	15
17	36	54	10	42	35	55	10
18	25	49	26	43	11	74	15
19	21	59	20	44	32	47	21
20	18	62	20	45	25	62	13
21	33	54	13	46	33	54	13
22	33	62	5	47	15	54	31
23	33	55	12	48	29	50	21
24	20	60	20	49	25	55	20
25	8	66	26	50	26	60	14

Results Concerning Sources of Superstition.—For each of the superstitious ideas the subjects indicated the source of the belief or disbelief in it. The data reveal, therefore, the relative contribution of each source toward the acquisition and the elimination of superstitious beliefs.

Table IV presents the average number of superstitions related to each source. It is obvious that when subjects learn from any source that certain ideas are true, it is an indication that that source tends to foster superstitious belief, and, conversely, when subjects learn from any source that certain ideas are false, it is an indication that that source tends to correct superstitious belief. The nature of the information given by each source is presented in Table IV. The column marked "Superstitions Heard" gives the average number of superstitions that were heard from a given source. The column marked "Reported True" gives for each source the average number of superstitions that were considered true. The column marked "Reported False" gives the number of superstitions considered, at each source, false. The column marked "Corrective Index" gives the ratio of the number heard as false to the number heard

as true. The higher this ratio the greater is the corrective influence of a source. Thus, the numbers opposite "friends" read as follows: The average number of superstitions heard from friends was 26.9. Of these, 17.5 were heard as true while 9.4 were heard as false. The Corrective Index of "Friends" was 54.

The most significant consideration of each source of superstition is whether it constitutes a fostering or a correcting influence. From this point of view the source of friends ranks first in order of fostering superstitions, and the home ranks second. From the point of view of correcting superstitions, the most effective source is observation. The influence of books, newspapers, school and church were combined into one educational source. The effect of this source tends in the direction of correcting beliefs in superstitions.

TABLE IV

SOURCES AND NATURE OF INFORMATION CONCERNING SUPERSTITIONS

Sources	Superstitions Heard	Reported True	Reported False	Corrective Index	Standard Deviation	
					True	False
Friends	26.9	17.5	9.4	54	12.6	12.3
Home	23.0	11.8	11.2	95	10.5	13.1
Observation	22.4	7.6	14.8	195	9.2	15.2
Educational	21.4	9.4	12.0	128	9.7	16.0
a. Books	8.4	4.2	4.2	100	6.7	9.0
b. School	7.6	2.7	4.9	181	4.0	10.3
c. Newspapers	4.0	1.9	2.1	111	4.3	6.7
d. Church	1.4	0.6	0.8	133	2.7	3.8
Total	93.7	46.3	47.4	102	32.7	42.1

TABLE V

AGE DIFFERENCE IN SOURCES OF SUPERSTITIONS

Sources	Younger Boys				Older Boys			
	Superstitions Heard	Reported True	Reported False	Corrective Index	Superstitions Heard	Reported True	Reported False	Corrective Index
Friends	25.7	18.4	7.3	40	24.6	11.9	12.7	107
Home	26.0	12.5	13.5	108	20.4	7.9	12.5	158
Observation	19.4	6.4	13.0	203	27.3	7.5	19.8	264
Educational	23.4	8.4	15.0	179	29.9	10.8	19.1	177
a. Books	9.4	3.8	5.6	147	11.0	5.1	5.9	116
b. School	10.0	2.4	7.6	317	9.4	2.7	6.7	248
c. Newspapers	2.9	1.6	1.3	81	6.9	2.3	4.6	200
d. Church	1.1	0.6	0.5	83	2.6	0.7	1.9	271
Total	94.5	45.7	48.8	107	102.2	38.1	64.1	168

CONSIDERATION OF THE VARIOUS SOURCES OF SUPERSTITIONS

1. *Friends.*—The results indicate that the source called friends is the most prevalent source of knowledge about superstitions. It contributes more to superstitious belief than the other sources combined, excluding the home. Although it contributes toward the learning and the unlearn-

ing of superstitions, the former influence is stronger. On an average, the pupils have heard from friends more ideas reported as true than as false. Sixty-five percent of the ideas traced to this source were marked true and only 35 percent were marked false. In other words, friends are more potent in encouraging superstitious beliefs than in correcting them. The Corrective Index for this source was only 54.

An interesting age difference was noted. In the younger group fully 72 percent of the ideas were marked true and 28 percent false. Among the older group the order was reversed, the percent of ideas marked false was higher than those marked true. The percentages were 52 and 48 respectively. The Corrective Index in the younger group was 40, and in the older group it was fully 107.

2. *Home.*—On an average the pupils have heard a slightly greater number of superstitions as true from the home than as false. Fifty-one percent of the ideas were heard as true and 49 percent as false. The Corrective Index for the home was 95, much higher than for friends. Again, a striking age difference was found. Among the junior high-school boys the superstitions heard at home as true constituted 48 percent, while the percentage heard as false was 52. Among the older boys only 39 percent were heard as true and 61 percent as false. The Corrective Index of the home for the younger boys was 108, while for the older boys it was 158. It appears that among younger pupils the home plays a more active part in promoting superstitious beliefs than it does among the older boys.

3. *Observation.*—Next in importance to friends and home is the source of personal observation. One would expect that the influence of this source would be altogether in the direction of eradicating superstitions. The results revealed that this is so only to a certain extent. The average number of items connected with this source was 22.4. Two-thirds of these, 14.8, were considered false, while one-third, 7.6, were considered true from observations. The observations of these pupils were apparently not altogether of a rational nature.[30] This source, however,

[30] It is interesting to quote in this connection the reasons given by Bacon for the unreliability of human observations: "In the first place the impressions of the senses are erroneous, for they fail and deceive us. We must supply defects by substitutions, and fallacies by their correction. Secondly, notions are improperly abstracted from the senses, and indeterminate, and confused when they ought to be the reverse. Thirdly, the induction that is employed is improper, for it determines the principles of sciences by simple enumeration, without adopting exclusions and resolutions, or just separations of nature. Lastly, the usual method of discovery and proof, by first establishing the most general propositions, then applying and proving the intermediate axioms according to them, is the parent of error and the calamity of every science."

had a higher correcting effect than any of the other major sources. Its Corrective Index was 195.

Among the older boys nearly three-fourths of the items connected with observations were considered false, and only one-fourth of them were verified as true. Among the younger boys these proportions were two-thirds and one-third respectively. The Corrective Index of observations was 179 among the younger boys and fully 264 among the older boys.

4. *Educational Sources.*—The sources listed under books, newspapers, school, and church were combined into one educational group. This was done because the numbers of superstitious items connected with these sources were relatively small and also because these sources are logically related. The average number of items connected with all of these sources combined was 21.4.

This source, as in the case of that of observation, was also in the direction of correcting rather than of fostering superstitions. Nevertheless, more than one-third of the items traced to these sources were heard as true. The Corrective Index of the educational sources was 128, which is considerably lower than the Corrective Index of observations.

It is interesting to note that in this source there was no age difference. In fact, the Corrective Index of the educational sources was slightly higher for the younger boys than for the older ones. The two indexes were 179 and 177, respectively.

The order of the sources in terms of their information concerning superstitions, based on the number of items heard, is: friends, home, observation, and education. Their order in terms of fostering superstitions (number of items heard as true) is: friends, home, education, and observation, and their order in terms of eradicating superstitions (number of items heard as false) is exactly the reverse: observation, education, home, and friends. The order of the sources in terms of the Corrective Index (ratio of false to true) is: observation, education, home, and friends.

Among the older pupils, who expressed belief in a relatively small number of superstitions, nearly all the sources had a high Corrective Index. Among the younger pupils, who believed in a larger number of superstitions, nearly all the sources had a low Corrective Index. Whether superstitions are fostered or eradicated seems to depend to a large extent upon the individual and his inclination to accept or to reject unfounded ideas.

Sex Differences in the Sources of Information Concerning Superstitions.—Table VI presents a comparison of the nature of information concerning superstitions which boys and girls of junior high-school age received from various sources. The average number of superstitions which were heard as true and the number heard as false from each source are given in the table. The Corrective Index, the ratio of the number of ideas reported as false to those reported as true, indicates whether the source is corrective or fostering in its influence upon superstitions.

TABLE VI

SEX DIFFERENCES IN SOURCES OF SUPERSTITIONS

Sources	Boys				Girls			
	Superstitions Heard	Reported True	Reported False	Corrective Index	Superstitions Heard	Reported True	Reported False	Corrective Index
Friends	25.7	18.4	7.3	40	29.8	22.3	7.5	34
Home	26.0	12.5	13.5	108	23.7	14.8	8.9	60
Observation	19.4	6.4	13.0	203	19.8	8.4	11.4	136
Educational	23.4	8.4	15.0	179	12.9	8.6	4.3	50
a. Books	9.4	3.8	5.6	147	5.5	3.6	1.9	53
b. School	10.0	2.4	7.6	317	4.7	2.8	1.9	68
c. Newspapers	2.9	1.6	1.3	81	2.1	1.7	0.4	24
d. Church	1.1	0.6	0.5	83	0.6	0.5	0.1	20
Total	94.5	45.7	48.8	107	86.2	54.1	32.1	59

The table reveals marked sex differences concerning the nature of information received from various sources. From each one of the four major sources the girls heard a greater number of superstitions reported as true than did the boys. The average number of items heard as true from all sources was 54.1 for the girls and 45.7 for the boys. On the other hand, the girls marked a smaller number of superstitions false than did the boys, the averages being 32.1 and 48.8 respectively.

The sex difference becomes particularly apparent when the Corrective Index is considered. In each one of the sources the Corrective Index among the boys was higher than among the girls. The home for example, presented a marked difference between boys and girls. The Corrective Index for this source is 108 among the boys and 60 among the girls. The sex difference is still more striking when we consider the educational source, that is, the combined effect of books, school, newspapers, and church, the Corrective Index being 179 for the boys and only 50 for the girls.

Observation is the only source which has a corrective influence upon superstition among both boys and girls. All other sources tend to have a fostering tendency among the girls. Friends are an important source for fostering superstitious beliefs among both boys and girls. The sum

total of all the sources with reference to superstitions is in the direction of being corrective among the boys, while among the girls the total influence is decidedly in the direction of encouraging belief in superstitions. The total Corrective Index was 107 for the boys and only 59 for the girls.

ITEM ANALYSIS BY SOURCES

In the preceding considerations the various sources were compared with respect to the degree of influence they exert in fostering or eradicating superstitions. The comparisons were based on averages and percentages. For the purpose of educational diagnosis and remedial work it is important to know what specific items of superstition are related to each of the sources. Such an item analysis is given in Tables VII and VIII.

Table VII presents the results concerning the nature of the information from the various sources by individual items. The table is based upon the reports of 100 seventh-and eighth-grade boys and girls. The numbers may therefore be regarded also as percents. The table reads as follows: 52 percent of the pupils indicated that they have heard from friends that the statement 1, "If you kill a snake, its tail will not die until the sun goes down" is true. Nineteen percent of the pupils were informed by friends that this statement is false. The remaining 29 percent reported as not having heard this statement from friends. The rest of the table is to be read in a similar fashion.

It is of interest to note the nature of the information concerning the various items from each source. Items are given in Appendix.

1. *Friends.*—A greater percentage of pupils have heard from their friends that the various superstitions are true than those who heard them as false. This holds true for each of the 50 items except one, item 9, "If you stare at a person's back, you can make him turn around and look at you." The superstition that "If two friends walk on opposite sides of a post, they will quarrel," ranks first in the order of having been heard as true. Sixty-four percent of the pupils indicated that they were told by friends that this idea was true, only six percent reported that they heard it as false, while 30 percent reported not having heard it at all. Sixty-three percent of the pupils were informed by friends that the following items are true: "If you find a four-leaved clover and if you carry a rabbit's foot, it will bring you good luck." The notion that, "If a person has a square jaw, it indicates that he has a strong will," has the lowest rank; only 19 percent reported having heard it as true.

TABLE VII

SOURCES OF INFORMATION BY INDIVIDUAL ITEMS

Items	Friends			Home			Observation			Books			School			Newspapers			Church		
No.	T	F	O	T	F	O	T	F	O	T	F	O	T	F	O	T	F	O	T	F	O
1	52	19	29	42	17	41	27	23	50	12	14	74	9	13	78	1	1	98	0	0	100
2	52	10	38	41	13	46	32	6	62	30	6	64	22	6	72	3	1	96	0	0	100
3	47	24	29	44	15	41	29	20	51	10	9	81	22	9	69	2	2	96	8	2	90
4	57	11	32	31	20	49	27	24	49	10	5	85	4	9	87	5	1	94	1	1	98
5	34	16	50	29	19	52	10	19	71	8	4	88	1	4	95	2	1	97	2	1	97
6	40	9	51	27	10	63	17	14	69	34	4	62	26	6	68	5	0	95	0	0	100
7	51	13	36	58	9	33	32	9	59	17	6	77	25	3	72	35	4	61	5	0	95
8	19	14	67	11	20	69	7	18	75	5	6	89	3	4	93	2	2	96	1	1	98
9	21	24	55	13	20	67	18	28	54	5	4	91	7	4	89	2	2	96	2	0	98
10	45	9	46	34	15	51	24	17	59	6	4	90	4	6	90	7	1	92	2	1	97
11	33	16	51	23	21	56	8	23	69	4	8	88	5	9	86	1	2	97	0	2	98
12	55	19	26	42	27	31	27	22	51	10	8	82	14	10	76	7	2	91	1	1	98
13	63	17	20	42	26	32	26	28	46	18	9	73	10	7	83	3	3	94	2	1	97
14	55	16	29	34	21	45	24	24	52	6	9	85	9	10	81	6	1	93	3	1	96
15	59	15	26	38	19	43	22	23	55	12	8	80	11	8	81	4	0	96	2	0	98
16	40	22	38	32	26	42	16	29	55	6	9	85	4	9	87	5	0	95	0	1	99
17	49	18	33	35	25	40	17	29	54	6	6	88	6	10	84	3	3	94	1	0	99
18	35	16	49	24	21	55	15	19	66	7	6	87	7	5	88	3	2	95	6	2	92
19	44	15	41	20	28	52	10	26	64	8	5	87	4	8	88	2	2	96	1	0	99
20	30	20	50	14	28	58	10	36	54	5	10	85	1	8	91	2	1	97	1	1	98
21	48	18	34	35	20	45	19	30	51	4	9	87	6	6	88	4	1	95	1	1	98
22	62	13	25	43	26	31	23	28	49	6	11	83	3	8	89	5	2	93	1	1	98
23	46	18	36	42	21	37	16	32	52	5	8	87	4	8	88	3	3	94	1	0	99
24	33	22	45	29	25	46	14	25	61	3	8	89	3	7	90	2	4	94	0	1	99
25	26	19	55	10	28	62	3	34	63	5	7	88	1	10	89	1	2	97	1	1	98
26	34	14	52	15	21	64	8	24	68	3	5	92	0	9	91	2	3	95	1	0	99
27	57	8	35	53	19	28	27	27	46	4	5	91	4	7	89	5	1	94	0	0	100
28	49	15	36	22	21	57	9	29	62	10	8	82	4	9	87	4	4	92	1	0	99
29	64	6	30	31	16	53	21	27	52	3	7	90	3	7	90	4	2	94	0	0	100
30	42	13	45	38	21	41	16	30	54	2	6	92	3	8	89	2	2	96	0	0	100
31	43	16	51	23	22	55	17	23	60	7	4	91	2	7	91	4	2	94	3	0	97
32	29	17	54	12	25	63	7	27	66	4	9	87	0	9	91	1	4	95	1	1	98
33	28	19	53	19	21	60	7	26	67	3	8	89	0	12	88	2	3	95	0	1	99
34	63	7	30	36	19	45	15	29	56	6	5	89	4	7	89	4	1	95	0	0	100
35	36	11	53	28	22	50	17	26	57	4	5	91	2	8	90	1	0	99	0	0	100
36	44	15	41	33	21	46	15	34	51	4	5	91	2	10	88	3	1	96	0	0	100
37	30	18	52	14	24	62	10	25	65	3	5	92	3	8	89	3	1	96	0	0	100
38	27	16	57	15	24	61	11	25	64	4	7	89	0	10	90	2	1	97	0	0	100
39	49	13	38	42	21	37	22	26	52	9	6	85	3	9	88	5	0	95	0	0	100
40	50	11	39	30	18	52	17	28	55	5	5	90	2	8	90	1	0	99	0	0	100
41	52	12	36	29	20	51	16	28	56	4	4	92	4	10	86	3	0	97	0	0	100
42	52	13	35	20	27	53	19	31	50	4	4	92	2	10	88	1	1	98	0	0	100
43	29	22	49	7	32	61	6	33	61	1	7	92	2	9	89	2	0	98	1	4	95
44	43	11	46	24	18	58	15	25	60	7	6	87	2	6	92	4	0	96	2	2	96
45	56	12	32	31	23	46	17	31	52	3	6	91	3	9	88	3	3	94	1	0	99
46	55	13	32	25	19	56	18	33	49	3	5	92	2	9	89	1	1	98	0	0	100
47	31	12	57	12	24	64	10	24	66	11	3	86	1	5	94	2	1	97	1	0	99
48	38	15	47	23	21	56	11	28	61	4	3	93	1	8	91	2	1	97	0	0	100
49	45	10	45	21	16	63	11	26	63	5	3	92	3	7	90	2	1	97	0	0	100
50	49	16	35	22	21	57	14	34	52	6	3	91	2	8	90	2	0	98	0	0	100

Among the items ranking highest in having been heard as false were the following: "A person who does not look you in the eye while talking with you, is very likely to be dishonest," "If a baby is good looking, it will grow up to be ugly; if ugly, it will become good looking when grown up," "If you drop a dish rag, you will have company," "If you

cross your fingers, you can lie and it won't count." Among the items ranking lowest in having been heard as false were the following, in order: "If you carry a rabbit's foot, it will bring you good luck," "If two people make wishes while breaking a wishbone, the one who gets the large piece will see the fulfillment of his wish."

The following items rank highest in the percentage of pupils, indicating that they did not hear them from friends: "If a person has a square jaw, it indicates that he has a strong will," "If you give your friend a knife or any instrument for cutting, it will sever your friendship," "If you were born under a lucky star, you will be influential and prosperous in life."

2. *Home.*—The home is an influence in fostering some superstitions while in others it serves as a corrective influence. The following examples will illustrate the kind of items that were considered true at home by a large percentage of pupils: "Our winters are milder today than they were 40 or 50 years ago," "If two people make wishes while breaking a wishbone, the one who gets the larger piece will see the fulfillment of his wish," "A person who does not look you in the eye while talking with you, is very likely to be dishonest," "If you break a mirror, you will have bad luck." Examples of items in which the home is a correcting influence are the following: "If you cross your fingers, you can lie and it won't count," "If you dream of one thing, the opposite will come true," "If thirteen individuals are seated at a table, one of this number will die within a year."

3. *Observation.*—This source has a corrective effect in regard to most superstitions. Only in seven items did observation have a fostering influence. An examination of these seven items revealed that nearly all of them may be classified as misconceptions. Such misconceptions may appear to be true from superficial observation. Let us consider, for example, item 1: "If you kill a snake, its tail will not die until the sun goes down." This may seem true to an individual who is not a keen observer, and his observation may even support his belief. Many of the lower animals do not die instantly as a result of severe injuries. A snake's tail may remain alive for several hours after it has been severed from the rest of the body. The idea that the severed part or tail dies after the sun goes down may be due to the fact that observation usually ceases at dusk and the part is found dead the next morning.

It was quite surprising to find that the following items rank highest in the percentage reported true from observation: "If squirrels gather an unusually large supply of nuts, it indicates that a severe winter is coming." "Our winters now are milder than they were 40 or 50 years ago," "A person who does not look you in the eye while talking with you is very likely to be dishonest."

The following two items were lowest in the percentage reported as true from observation: "If thirteen individuals are seated at a table, one of this number will die within a year." "If you cross your fingers, you can lie and it won't count."

4. *Educational.*—It is interesting to note some items that were reported by large numbers as true from educational sources. About one-third of the pupils stated that they read in books that "If squirrels gather an unusually large supply of nuts, it indicates that a severe winter is coming." More than one-fourth of the pupils testified that they were taught at school that "Beavers know by their instinct whether the coming winter will be mild or severe." From newspapers, 35 percent of the pupils obtained the notion that "Our winters are milder than they were 40 or 50 years ago." Eight percent reported that they were informed at church that "A person who does not look you in the eye is likely to be dishonest."

Composite of All Sources.—The general prevalence of items and the nature of information concerning them may be seen from Table VIII. This table gives the total number of times an item was heard from any source. The percentage of times it was heard as true and as false is also given. The table is based on the records of 100 junior high-school pupils. The statement "Our winters now are milder than they were 40 or 50 years ago" ranked highest in the percentage of pupils reporting to have heard it as true. It is interesting to note that this item ranked also first in the percentage of pupils expressing belief in it. The statement "If thirteen individuals are seated at a table, one of this number will die within a year" ranked lowest in the percentage reported as true from all sources. This item also ranked lowest in the percentage of belief. This is additional evidence of the correlation between the nature of information concerning an item and the extent of belief in its correctness. The correlation between the corrective index of an individual's information and the number of items he believed in was $-.246 \pm .05$.

TABLE VIII

NATURE OF INFORMATION BY INDIVIDUAL ITEMS

Item	Number of Reports	Percent Reported as True	Percent Reported as False	Item	Number of Reports	Percent Reported as True	Percent Reported as False
1	230	62.2	37.8	26	139	45.3	44.7
2	222	81.1	18.9	27	217	69.1	30.9
3	243	66.7	33.3	28	185	53.5	46.5
4	206	65.5	34.5	29	191	66.0	34.0
5	150	57.3	32.7	30	183	56.3	43.7
6	192	77.6	22.4	31	173	57.2	42.8
7	267	83.5	16.5	32	146	37.0	63.0
8	113	42.5	57.5	33	149	39.6	60.4
9	150	45.3	54.7	34	196	65.3	34.7
10	175	69.7	30.3	35	160	55.0	45.0
11	155	47.7	52.3	36	187	54.0	46.0
12	145	63.7	36.3	37	144	43.8	56.2
13	255	64.3	35.7	38	142	41.5	58.5
14	219	62.6	37.4	39	205	63.4	36.6
15	221	67.0	33.0	40	175	60.0	40.0
16	199	51.8	48.2	41	182	59.3	40.7
17	208	56.2	43.8	42	184	53.3	46.7
18	168	57.7	42.3	43	155	31.0	69.0
19	173	51.4	48.6	44	165	58.9	41.1
20	167	37.7	62.3	45	198	58.5	41.5
21	202	57.9	42.1	46	184	56.5	43.5
22	232	61.6	38.4	47	137	49.6	50.4
23	207	56.5	43.5	48	155	51.0	49.0
24	176	47.7	52.3	49	150	58.0	42.0
25	148	31.8	68.2	50	177	53.7	46.3

READING PREFERENCE AND BELIEF IN SUPERSTITION

In order to determine the relationship between belief in superstition and the type of reading material preferred, the students were asked to indicate their choice of books. The question read as follows:

"The list below represents 10 types of books. Underline one type that you like best to read.

Adventure	Mystery Stories	Travel
Biography	Fiction	Invention
History	Economics	Science
		Fairy Tales"

The order of first choice of books as revealed by the answers of 128 students was as follows:

Type of book chosen	Number of students indicating first choice
Mystery stories	66
Adventure	36
Fiction	14
Science	12
Invention	9
Fairy Tales	5
Travel	4
Biography	2

The students were then divided according to the type of book given as first choice and the average "superstition score" was computed for each group.[31]

Those whose choice was invention and science were least superstitious, the average scores being 7.6 and 10.8 respectively. The most superstitious groups were those preferring adventure stories, mystery stories, and fiction.—Their average scores were 13.6, 14.1, and 14.3, respectively.

The combined science group including those who chose science, invention, history and travel (27 cases), indicated a belief in 21 percent of the unfounded ideas.

The combined fiction group, including those who chose fiction, mystery, adventure and fairy tales (121 cases), indicated a belief in 27 percent of the unfounded ideas.

The difference in favor of the science group was 1.63 times the standard error of the difference. Although the difference is not statistically significant, it indicates that the choice of reading material is somewhat related to a person's belief or disbelief in superstitious ideas.

TABLE IX

READING PREFERENCE AND BELIEF IN SUPERSTITION

	Science Books		Fiction Books
Number of Cases	27		121
Average Score of Belief	10.65		13.84
Standard Deviation	8.90		10.48
Score per 100 Items	21.30		27.68
Difference		3.19	
D/σ difference		1.63	

SUMMARY AND CONCLUSIONS

1. A list of 50 statements of common superstitions and other unfounded beliefs was presented to 179 junior and senior high-school pupils. They were asked to state for each item whether or not they believed it to be true and to indicate whether they were informed concerning the correctness or incorrectness of the item from the following sources: home, friends, school, church, books, newspapers, and observations.

2. The average pupil expressed a belief in 30 percent of the items, a disbelief in 55 percent, and uncertainty about 15 percent of the items.

3. Young pupils were found to believe in a greater number of items than the older ones. The correlation between belief and age was $-.23 \pm .05$.

[31] For comparison with other groups on the distribution of reading preference among these types of books see Maller, J. B. "Personality of the Candidates for the Edison Scholarship," *School and Society*, XXXV (March, 1932), p. 900.

4. Girls expressed belief in a greater number of superstitions than boys. The difference in terms of its standard deviation was 3.0.

5. The source that ranked first in order of fostering superstition was that of friends. This source ranked last in order of correcting superstitions. Next in order was the home, while the educational sources and observation were found to contribute least to belief in superstitions.

6. The order of the sources in correcting superstitions was: observation, educational, home, friends.

7. The Corrective Index of each of the sources was higher among the boys than among the girls.

8. Among younger pupils the Corrective Index was lower than among older ones as far as friends, home, and observation were concerned. The Corrective Index of the educational source was slightly higher among the younger pupils.

9. There is a relationship between the extent of belief in superstition and the nature of information received from the various sources. The correlation between the number of an individual's beliefs and the Corrective Index of the sources of his information was $-.25 \pm .05$.

10. There is some relationship between the number of superstitious beliefs and the type of reading preference. Those preferring books of science and invention expressed less belief in superstition than those preferring books of fiction, adventure, and mystery.

The results indicate that the effectiveness of each of the sources, whether it is in the direction of fostering superstition or correcting superstitions, depends upon the total background of the individual. The same source may be fostering superstition in one individual and correcting superstitions in another.

APPENDIX

LIST OF UNFOUNDED IDEAS USED IN THIS STUDY

1. If you kill a snake, its tail will not die until the sun goes down.
2. If squirrels gather an unusually large supply of nuts, it indicates a severe winter is coming.
3. A person who does not look you in the eye while talking with you is very likely to be dishonest.
4. A person who has red hair usually has a violent temper.
5. If cousins of good parentage marry, their children are likely to be weakly or feeble-minded.
6. Beavers know by their instinct whether the coming winter will be mild or severe.
7. Our winters now are milder than they were 40 or 50 years ago.

8. If a person has a square jaw, it indicates that he has a strong will.
9. If you stare at a person's back, you can make him turn around and look at you.
10. When people who have rheumatism feel increased pain in the joints, there will soon be rain.
11. Seven is a lucky number.
12. Thirteen is an unlucky number.
13. If you find a four-leaved clover, it will bring you good luck.
14. When boasting or bragging of your good luck, you should knock on wood to keep your good luck from changing.
15. If you find a horseshoe, you will have good luck.
16. If a baby is good looking, it will grow up to be ugly; if ugly, it will become good looking when grown up.
17. Friday the thirteenth is a very unlucky day.
18. When a child smiles in his sleep, angels are talking with him.
19. If you make a wish while seeing a falling star, your wish will be fulfilled.
20. If you dream of one thing, the opposite will come true.
21. If a dog howls, it is a sign of death in the family.
22. If you break a mirror you will have seven years of bad luck.
23. If you drop a knife, fork, or spoon, you may expect company.
24. If you drop a dish rag, you will have company.
25. If thirteen individuals are seated at a table, one of this number will die within a year.
26. It is bad luck to light three cigarettes with one match.
27. If two people make wishes while breaking a wishbone, the one who gets the larger piece will see the fulfillment of his wish.
28. Certain lines and markings in a person's hand foretell his fortune.
29. If two friends walk on opposite sides of a post, they will quarrel.
30. If your nose itches, you will have company.
31. You should throw rice and old shoes at the bride and groom in order that they may have good luck.
32. You should cut your hair during the new moon so that it may grow better.
33. You will have bad luck if you kill a cat.
34. If you carry a rabbit's foot, it will bring you good luck.
35. If you start on a trip and turn back for something forgotten, it will bring you bad luck.
36. If you change a garment that has been put on wrong side out, it will bring bad luck.
37. If you see the new moon over your right shoulder, it will bring you good luck.
38. If you give your friend a knife or any instrument for cutting, it will cut your friendship with him.
39. If you open an umbrella in the house, it will bring you bad luck.
40. You will have good luck if you find a pin with the point lying toward you.

41. Always get out of bed "on the right side."
42. It is bad luck when walking with another person to let any object come between; you may avert the evil by saying "bread and butter."
43. If you cross your fingers you can lie and it won't count.
44. The girl who catches the bride's bouquet at a wedding is next to be married.
45. If you walk under a ladder, it will bring you bad luck.
46. If two people accidentally say the same thing at the same time and then link their fingers together and make a wish, it will come true.
47. If you were born under a lucky star you will be influential and prosperous in life.
48. If your right ear itches or burns, someone is saying something good about you.
49. On a child's birthday he should receive one blow on his back for each year he has lived that he may have good luck in the future.
50. If you make a wish upon seeing the first star in the evening, the wish will come true.

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CERTAIN ASPECTS OF THE PROBLEM OF WHERE WE STAND WITH REFERENCE TO THE PRACTICABILITY OF GROUPING[1]

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THE spread of homogeneous grouping or grouping students in sections for special instruction has followed the more or less conventional course of promising developments in school organization and teaching practice. It has suffered heavily at the hands of its friends who have misapplied and exaggerated the scientific basis from which it developed. Some of them have invested it with unsupportable theoretical virtues which have invited damaging inflation and which have become the targets of those who enjoy attacking progressive movements at their greatest points of weakness. Teachers, principals, superintendents in the field, and instructors in classroom education, fired with an enthusiasm born of partial knowledge and half-truth, in most cases the result of superficial and casual contacts with the more reliable literature relating to grouping, overshot their mark. In numerous instances they have carried homogeneous grouping into practice on a basis which implied too great a confidence in the validity of the criteria employed in grouping and too little appreciation of the necessity for most careful techniques.

More recently, there have appeared, in the literature of education, statistical and analytical studies which have capitalized these indiscretions in such a way as to raise a doubt whether grouping as a desirable educational procedure is not a myth or a delusion, resulting in more harm than good. The statistical studies have convinced many that homogeneous grouping is not possible, that in these instances in which supposedly

[1] Homogeneous grouping is employed here to designate the temporary classification, for the purposes of instruction of pupils enrolled in the same subject class, into two or more divisions or groups on the basis of the pupils' estimated ability to profit most by different amounts and kinds of subject matter in the subject. Homogeneous grouping, as discussed here and as generally thought of, involves homogeneity with respect to no other trait or characteristic. "Homogeneous" groups may be quite heterogeneous as to age, health, religion, vocational plans, socio-economic status, nationality, weight, tastes, and appearance. It does not, as used in this discussion, imply grouping of students for instruction in all subjects on the same basis, or grouping for extra curricular activities or other extra-classroom social contacts. It does not involve any particular viewpoint as to objectives or materials of instruction other than that the great differences between pupils of the same grade in their capacity to achieve in learning situations seems logically to necessitate the adaptation of learning materials and methods, particularly if the more capable pupils are to profit as much as they are able from school education and the less capable are to avoid the stigma and unhygienic mental experiences that follow continued unsuccessful attempts to achieve beyond their possibilities.

"homogeneous" groups have been formed they are practically as heterogeneous as the entire body of pupils from which the groups were formed. While it would be, indeed, unfortunate if it were not possible to measure ability or to predict pupil achievement for a semester to such an extent that instruction could be better adapted to the wide range of differences that we know exists among pupils of the same grade, the demonstration of impossibility would be a valuable contribution to educational theory and practice.

At present, teachers, supervisors, administrators, and instructors in education are, for the most part, very badly confused as to where we stand with reference to grouping. Those who became converts to the idea and who a year or so ago regarded it as an obvious and logical step forward are now astounded to learn that new scientific investigations indicate that they have been pursuing a will-o-the-wisp which they "will surely abandon as soon as they learn the truth." They can hardly fail to be impressed and their enthusiasm to be dampened if they pause to reflect that the fallacies of homogeneous grouping have, apparently, been so firmly established by scientific investigations that investigators have given their conclusions to the lay press and the general public.

It is, however, with the fear that the results of these studies may result in an unjustified overemphasis of a reactionary trend that this article is written. It is actuated by a belief that at least those studies which have been the basis of the conclusion that homogeneous grouping is impossible, do not furnish a sufficient basis to warrant sweeping conclusions. In fact, it seems that the study which has been made the chief basis for such conclusions, that of Marvin Y. Burr,[2] involves several unquestionable inaccuracies and definitely doubtful procedures in the light of which it becomes very difficult to place great confidence in his principal conclusions.

There are four possible approaches to the problem which have been employed by those who have studied it. For the sake of identification, these may be referred to as the theoretical, the statistical, the experimental, and the empirical.

Of the first type, the theoretical, deductive, and analytic studies, there have been many which, in the minds of their authors at any rate, justify the teaching of pupils in groups less heterogeneous than the typical class group. Others have presented very plausible arguments against grouping.

[2] Burr, Marvin Y. *A Study of Homogeneous Grouping*, Contributions to Education, No. 457, New York: Teachers College, Columbia University, 1931.

As a means of definitely evaluating the relative merits of grouping, this approach availed us little, except to widen two divergent points of view. Miss Keliher's most careful deductive analysis[3] has done little more than to confirm the opponents of grouping in their opinions and to arouse the advocates of grouping to protest against what they feel to be a partisan attack upon a statement of the fundamental assumptions of grouping which is formulated by Miss Keliher but which is not generally acceptable. Her conclusions and the theoretical arguments of McGaughey and others seem no more convincing, if as much so, than the rebuttals of Otis, Turney, and others.[4]

A more objective and convincing approach is the statistical approach. The chief concern of those who have employed this method has been to show to what extent it is possible to construct the homogeneous groups and to what extent the abilities of individual pupils in the various subject matter fields are relatively uniform. The outstanding investigation of this type is that of Dr. Burr, who tried demonstrating that homogeneous groups are not homogeneous, from which Professor McGaughey and others have drawn conclusions concerning the "fallacies" of homogeneous grouping.

Dr. Burr studied supposedly homogeneous groups in 21 schools located in six different cities. The pupils studied were in grades 4, 5, and 6. These pupils had been grouped on the following bases: school A, average educational age and teachers' judgments; school B, mental age and teachers' judgments; school C, combined intelligence and achievement scores, plus teachers' judgments; school D, combination of intelligence and achievement test scores and teachers' judgments; school E, probable learning rate score; and school F, average educational age. It should be noted in passing that in none of these schools were pupils grouped on the basis of school marks made in the previous grade of school, although Brooks[5] and others have repeatedly found that the average school mark is definitely superior to intelligence test scores and

[3] Keliher, Alice V. *A Critical Study of Homogeneous Grouping*, Contributions to Education, No. 452 (New York: Teachers College, Columbia University, 1931), 165 pp.

[4] Otis, R. S. "Fallacious Arguments Regarding Ability Grouping," *Childhood Education*, VIII (December, 1931), pp. 171-180.

Turney, A. H. "Shall Ability Grouping Be Discontinued?" *Elementary School Journal*, XXXII (November, 1931), pp. 227-232.

[5] Brooks, Fowler D. *Psychology of Adolescence* (Boston: Houghton Mifflin Company, 1931), pp. 558-574.

achievement test scores as a basis for prediction of success in the upper grades of the elementary school and in the high school.

In the interpretation and the statistical treatment of his test scores, Burr has made several errors, all of which, unfortunately, operate in the same direction, namely, to exaggerate the significance of the apparent overlapping and the inaccuracies of prediction. In the first place, in computing the amount of overlapping, tests[6] were employed which were intended to measure the achievement resulting from instruction in all of the previous grades of the elementary school as well as that in which the pupils were classified at the time. What Burr has shown is, of course, that the students as classified in these cities do not compose groups homogeneous in *educational status* as measured by these tests. It is not the chief objective of grouping to classify pupils on the basis of *educational status* but to classify them on the basis of their *ability to achieve*. When one bears in mind that some of these pupils have taken from one to six or more years to arrive at their educational status, then it is clear that a measure of educational status is a very crude measure of ability to achieve. This fact, in itself, renders the conclusions based upon the data somewhat inapplicable.

In the second place, in depicting the relatively large heterogeneity of these supposedly homogeneous groups, he has failed to take into consideration that, in grouping, the important objective is not to combine groups of pupils who will make the same *fallible* score on a standard test but groups be constructed of pupils relatively homogeneous as to their *actual* or *true* ability. Regressed scores approximate true ability with less error than do unregressed scores. He has therefore, in employing the method of comparing the standard error of estimate of a fallible score with the standard deviation of the group, that is, the ratio of $SD\sqrt{1 - r^2_{12}}$ to SD failed to avail himself of a more accurate approach to his problems. The problem is the prediction of true ability from a fallible score, and the most accurate formula to employ as a measure of the standard of estimate is not $SD\sqrt{1 - r^2_{12}}$, but $SD\sqrt{r_{11} - r^2_{12}}$ in which r_{11} is the reliability of the criterion employed to test the efficacy of grouping, and the coefficient of correlation between that criterion and the basis of the grouping.[7]

[6] For example, the Woody-McCall Arithmetic Scale, Franzen Health Knowledge Test, The Stanford Achievement Tests, etc.

[7] Kelley, T. L. *Statistical Method* (Yonkers-on-Hudson, New York: World Book Company, 1923), p. 215.

Employment of the correct formula indicates a greater degree of accuracy in prediction. If the reliability of the Thorndike-McCall Reading test for the half-grade being grouped is taken to be .75, a very fair estimate for a single half-grade in a given school of average size, and the correlation between the basis employed for grouping and the Thorndike-McCall Reading Test is .69 as reported by Burr, the resulting ratio is $\sqrt{.75 - .48}$ or .52. In other words, a chance or ungrouped class should be, on the average, practically twice as heterogeneous as a section thus grouped.

It may be argued that in evaluating the efficacy of any variable in predicting true scores the appropriate ratio to employ is that of $SD\sqrt{r_{tt} - r^2_{12}}$ to $SD\sqrt{r_{tt}}$, the latter being the variable of the estimated true scores that should obtain in case chance grouping was employed. Even so, the predictive merit of a correlated variability is greater than that given by the inapplicable formula employed by Burr. The ratio reduces to $\sqrt{1 - r^2_{12} \div r_{vt}}$ as compared to the $\sqrt{1 - r^2_{12}}$ of Burr's method. Since r_{tt} is always certain to be less than 1.00 the value of the expression is certain to be less than the latter and as r_{tt} recedes from 1.00, the difference becomes greater.

A major unit of Burr's study is based upon profiles of the educational status of individual pupils in various subjects. These exhibit material irregularity. It should be borne in mind, however, that if in the interest of accuracy, regressed scores had been employed, as seems most desirable, less irregularity would have resulted. It should also be obvious that a graphical representation of these profiles in terms of percentile rank serves to exaggerate irregularity near the mean or median out of proportion to the differences in the scores. The use of this procedure, however, probably, does not in itself result in serious material errors.

A method which Burr did not employ seems, to the author of this paper, better adapted as a measure of the effectiveness or ineffectiveness of various bases for grouping. In grouping, the chief concern is not whether there is exact correspondence between the ranks of individual pupils on the tests by which their progress in class is measured and their respective ranks in the test or other criterion by which they were classified, a measure of which is the correlation coefficient. A more practical measure of efficiency is the extent to which a classification will place pupils in the correct section. For our purpose the tables prepared by Thorndike showing the normal percentage of displacements for various

values of the coefficient of correlation seem to constitute a more pertinent measure of grouping effectiveness than the ratio of standard error of estimate to the standard deviation which was employed in Burr's study. If we may assume that 20 percent of each class should be placed in a slow section and 20 percent in the abler section, and the remaining 60 percent in the middle group, we may expect on the average, results as follows: for a correlation of $r = .80$ between the classifying score or rank and the pupils ability to achieve, 72 percent of the pupils are on the average accurately placed, and 28 percent are placed in a group just above or just below that in which they belong; for a correlation of $r = 70$ the corresponding figures are 64 percent and 36 percent.

It would seem that where grouping is done most carefully a coefficient of correlation between .70 and .80 is a fair measure of the relationship between the bases for grouping and later achievement. Multiple coefficients in excess of .60, ranging as high as .75, are obtained quite regularly when the best methods are employed, and these should become still larger when corrected, as they should be, for attenuation or lack of reliability in the variable, employed as the measure of achievement.

In another particular, Burr has employed a procedure which resulted in the amount of overlapping employed in his conclusions which were spuriously increased beyond that actually present in his original data. He smoothed his original frequency curves, employing as a basis for calculating overlapping the second smoothing of the raw curves. The effect of smoothing is to increase the range and to increase the frequencies near the extremes of the frequency curve! An indefinite repetition of smoothing would result in a straight line with as many frequencies at the extremes as towards the central tendency or at any other point in the curve.

In view of these considerations, one is undoubtedly safer in following Kelly[8] in his conclusions, supported by much more acceptable statistical procedure: what is measured by intelligence tests and what is measured by achievement are largely the same thing. This is particularly true when one bears in mind the high positive correlation between rankings of pupils on two standard tests in different subjects and between marks received in different academic subjects.

The conclusion which should be made from the study by Burr, is not different from that arrived by many students of the phenomenon

[8] Kelly, Truman L. *Interpretation of Educational Measurements* (Yonkers-on-Hudson, New York: World Book Company, 1927), pp. 202-210.

of overlapping in "homogeneous" groups, namely: that while completely homogeneous groups are not things of possible realization, groups may be constructed of materially less heterogeneity than the typical heterogeneous class section.

Space is not available here for a discussion of the claims that since intelligence is made up of specific traits school subjects possess specificity that renders impossible grouping on one basis for all subjects. The following brief statements must suffice:

1. It has not been shown that intelligence does not possess a large common factor. Far from being an axiomatic premise from which to reason, it is still a matter of controversy.

2. Even were it established, ability to profit by the study of different school subjects may not be thought of as the separate specific mental functions but rather as the combination of a number of specific abilities.

3. Regardless of the theoretical arguments, coefficients of correlation between achievements in the various school subjects when measured by tests of high reliability have been found by Kelly and others to be unusually high, ordinarily in excess of .80, except for subjects which involve motor or musical abilities.

Whether or not the construction of groups sufficiently homogeneous in different subjects to be theoretically worth while is possible, the results of controlled experiments though conducted under conditions unfavorable to grouping seem to favor grouping.

It will be impossible to review here individually the experimental studies of the value of grouping. This has been done rather well by Miller and Otto,[9] Turney,[10] and Rankin.[11] In only eight of the studies of the elementary or high-school level reported by Miller and Otto were control groups employed. In two of these studies no clear gains were found for either method. In five, gains were found in favor of homogeneous groups, and in one gains were found in favor of the mixed groups.

Three other controlled experiments reviewed by Turney are worthy of mention: those by McCall, Engel, and Purdom. The first two of these experiments favored segregation and in the last named no significant difference was noted. In addition to these, three others may be noted.

[9] Miller, W. S. and Otto, Henry J. "Analysis of Experimental Studies in Homogeneous Grouping," *Journal of Educational Research*, XXI (February, 1930), pp. 95-102.

[10] Turney, A. H. "The Status of Ability Grouping," *Educational Administration and Supervision*, XVII (January, 1931), pp. 21-42.

[11] Rankin, Paul T. "Pupil Classification and Grouping," *Review of Educational Research*, I (June, 1931), pp. 200-232.

One of these was reported by Holy and Sutton.[12] This study was conducted with classes in algebra in schools of Dayton, Marion, and Springfield, Ohio. On each of three different standard tests in algebra the difference in gain favored the homogeneous groups. In another conducted by Kutkowsky[13] with 380 junior high-school pupils in Minneapolis, greater progress as measured by standard tests for arithmetic, geography, history, and reading was made in 18 of 32 units of comparison in homogeneous groups, while in the remaining 14 units no differences, or differences in favor of heterogeneous groups, were reported. Fowlkes[14] and Sanderson in an experiment conducted with two B7 grades at Glendale, California, found that groups classified on the basis of I.Q. as calculated from National Intelligence Test scores, gained on the average slightly less than heterogeneous groups when measured by Stanford Achievement Tests.

Some of these experiments are not sufficiently reliable to be more than suggestive. In general, it would seem that much work remains to be done before definite conclusions can be drawn. By its very peculiar nature, the problem is a most difficult one. If the materials of instruction are not adapted, no true test of the possibilities of grouping is possible. If they are, it seems almost impossible to devise tests which will give comparable measures of the achievements of sections at different levels following different courses of study.

It seems logical that if only slight advantages are found in favor of homogeneous grouping it is very encouraging. It is certain that grouping is not done with the greatest accuracy already possible, much less with the accuracy that may be reasonably expected after a few years of continued study and investigation.

One may feel quite certain also that the adaptations to the different levels are only passably accomplished. In the majority of the experimental studies of grouping, there is no evidence that the teachers in charge of the homogeneous groups had had adequate experience in making adequate curricular adjustments. It is most probable that their efforts in this direction were far from the degree of mastery which they may be reasonably assumed to have attained in the traditional heterogeneous class. If small differences favorable to grouping are obtained

[12] Holy, T. C., and Sutton, D. H. "Ability Grouping in the Ninth Grade," *Educational Research Bulletin*, Ohio State University, IX (October 22, 1930), pp. 419-422.

[13] Kutkowsky, A. T. Unpublished Master of Art's thesis, University of Minnesota, 1930.

[14] Fowlkes, John Guy. "Homogeneous or Heterogeneous Grouping—Which," *The Nation's Schools*, VII (October, 1931), pp. 74-78.

under these conditions, there is every reason to suppose that greater favorable differences will accompany continued experimentation and experience.

The fourth and less reliable type of approach is that of opinion and of semi-objective methods. Space limitations permit only the mention of the studies of Lamson, Hyde, Lincoln and Wadleigh, Smead, Torgerson, Santee, Layton, Rainey and Anderson, and others which may be included in this category. The net conclusions, however, are clear and definite. Teachers and pupils overwhelmingly favor grouping and where it has been employed a marked drop in failures has followed.

One can place no great amount of confidence in opinions of teachers and pupils as conclusive data. Possibly the decreases in failures reported may be due to other causes, for example, a lowering of standards. Possibly the favorable results of controlled experiments were due to other causes. But, at least, when taken all together they tend to arouse suspicion that it is not yet settled that grouping is not possible, practical, or advantageous.

To summarize, the following statements seem to me to represent where we stand today with reference to grouping.

1. Homogeneous grouping as taken to mean the construction of sections of pupils entirely homogeneous in any one school subject seems impossible.

2. Grouping together pupils which are decidedly more homogeneous in all school abilities than will be found in ordinary grade classification traits may not be accomplished as yet.

3. Homogeneous grouping as taken to mean grouping pupils for instruction who are definitely more homogeneous in ability to achieve in a given subject or in a group of "academic" subjects than in ungrouped sections is quite within the possibilities of careful techniques.

4. Grouping separately for each subject is more likely to produce groups more homogeneous than grouping for all subjects on the same basis.

5. Grouping may be done materially more accurately if previous marks, mental age, and intelligence quotients are all employed than if but one of these is used.

6. As indicated by the relatively low coefficients of correlation, grouping for all subjects on the same basis seems certain to result in sufficient lack of homogeneity in some subjects such as art, drawing, penmanship, music, physical education and shop subjects, that either separate regrouping for each of these subjects must be made or no attempt be made to differentiate instruction as between groups.

7. The fact that groups are never completely homogeneous dictates that within any group provisions be made for variations among pupils in ability, interest, and industry. Homogeneous grouping does not relieve the teacher of that responsibility.

8. Homogeneous grouping is in no necessary conflict with the education of the whole child, though its extension in this direction may be invited by its apparent emphasis upon subject matter objectives.

9. While homogeneous grouping has been frequently found more effective than heterogeneous grouping, the question has not been removed from that of unsolved problems, and the difficulties of adequate experimentation discourage hopes for any immediate definite answer.

10. Teacher and pupil opinion in those studies that have been reported have almost overwhelmingly favored homogeneous grouping.

11. Reduction in the number and percentages of failures has usually accompanied the introduction of grouping.

12. Homogeneous grouping may be accomplished more accurately than it is being done in many schools and if it is to be an asset to the school it must be done with unusual care and skill.

13. Homogeneous grouping is merely a plan of organization which facilitates the better adaptation of educational materials and methods to the needs of the pupil and does not in itself insure better instruction.

Two lines of development would be beneficial for the cause of sane educational theory and practice. Teachers, administrators, and instructors in classes in education should realize the need for a most careful technique in instructing homogeneous groups and for adequate provision for: (1) differences still remaining within groups, and (2) adaptation of course of study to the differentiated groups.

On the other hand, it seems rather regrettable that, until more careful study had been made, there should have appeared unqualifiedly positive statements with reference to the impracticability of reducing heterogeneity and that such strong statements as to the desirability of grouping should have received so widespread publicity.

Research and scientific investigation in education as in all fields will deserve and receive greater confidence and respect when ideals of rigorous accuracy takes precedence over premature tendencies toward wide-spread publicity.

A SURVEY OF NURSERY SCHOOL COSTS[1]

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THE aim of this survey is to secure data on the cost of nursery schools, together with certain information relevant to an analysis of such costs. A questionnaire was designed to secure concrete data on various nursery school activities and their costs.

Three hundred nursery schools scattered over the country were asked to report data. This sampling was secured chiefly through the courtesy of Dr. John E. Anderson who furnished the list assembled by the White House Conference on Child Health and Protection. Of these, one hundred schools returned the post card stating that they would fill out the questionnaire. Only sixty schools, however, responded within a generous interval of time. In Table I is given the percentage geographical distribution of the three hundred nursery schools in juxtaposition with the sixty which responded. Geographically the skewness in the smaller sample is very slight.

TABLE I

SAMPLING—PERCENTAGE DISTRIBUTION

	East*	South*	Middle West*	Far West*
	%	%	%	%
Sample of 300	39	12	35	14
Sample of 60	32	15	40	13

**East* includes states east of Ohio and north of Virginia; *South* includes states south of Mason-Dixon line; *Middle West* includes Nebraska and eastward, also Missouri, Kansas and Oklahoma; *Far West* includes Colorado and westward.

The sampling of sixty schools has been divided into three classes; viz.:

Class I—All day
Class II—Half-day (A. M. or P. M.) + dinner
Class III—Half-day only

Within each class the auspices of the school are indicated below:

CLASS I	CLASS II	CLASS III
14 private		11 private
17 college or university	7 college or university	7 college or university
2 other		2 other
33 total	7 total	20 total

The findings reported below are based on sixty nursery schools unless otherwise indicated.

[1] Conducted under the auspices of the General Education Board.

I. General Information

1. *Enrollment*

Upper quartile	26
Median	19
Lower quartile	12
Range	4 — 72

2. *Number of children per teacher*

Upper quartile	10
Median	7
Lower quartile	5
Range	2 — 14

The ratio of teachers to pupils is high in the nursery school. The reports also indicate that a 10 percent increase in initial enrollment would be possible without any increase in cost of overhead, plant and equipment, or teaching staff. It is clear that at slight extra expense the teacher load could be increased.

3. *Number of days per school year*

Upper quartile	176
Median	165
Lower quartile	155
Range	122 — 235

4. *Length of the school day*

Class I—median, 7 hours
Class II—median, 4 hours
Class III—median, 3 hours

5. *Teacher activity*

The percentage distribution of teacher time is given below. These figures are medians.

Teaching children	74%
Teaching adult students	11%
Teaching parents	10%
Special duties	5%

The percentage of time given to teaching adult students reflects the college or university weighting in the sampling.

6. *Training of teachers*

Medians indicating the distribution of training among nursery school teachers are given below.

Master's degree or beyond	30%
Bachelor's degree only	42%
Two years normal or teachers' college only	21%
High school graduate only	4%
High school attendance only	3%

7. *Age range*

The age range of the children is primarily from ages two to four, with a small scattering up to the age of five.

8. *Extent of parent education*

Number of Meetings Per Year Conducted by Nursery School Teachers (N = 37)

Upper quartile	11
Median	9
Lower quartile	7

Number of Parents Registered (N = 28)

Upper quartile	51
Median	23
Lower quartile	15

II. HOUSING

Table II indicates the median costs of various items with respect to Classes I and III. It is to be noted that the number of cases drops when the medians are based on a total of several items. This indicates that certain items were not reported in some of the blanks. The selection due to this factor, however, is small, inasmuch as the sum of the medians for rent and other annual costs computed item by item varies little from the figure obtained only from those blanks which were complete.

TABLE II

HOUSING*

All figures are medians; the number of blanks contributing to the median is indicated in the columns under N

	Item	Class I (Full-day)	N	Class III (Half-day)	N
(1)	Rent	$1200	19	$540	13
(2-a)	Heat	200	13	61	8
(2-b)	Light	40	14	15	9
(2-c)	Gas	40	15	11	8
(2-d)	Water	25	15	12	11
(2-e)	Telephone	52	22	34	10
(2-f)	Janitor	229	16	95	11
(2-g)	Extra cleaning	27	13	20	7
(2-h)	Tenant repair	52	11	50	6
(2-i)	Miscellaneous	50	13	45	8
Total (2a-2i)		$715	13	$343	5
Total all items		$1915	13	$883	5

* Class II is not reported on account of insufficient data.

III. SPECIAL NURSERY SCHOOL EQUIPMENT

1. *Total initial cost of furniture, fixtures, semi-permanent apparatus, small playthings, and materials of instruction*

Class I (N = 30)		Class III (N = 14)	
Upper quartile	$2734		
Median	$1277	Median	$450
Lower quartile	$829		

2. *Average annual replacement, repairs, painting, and laundry*

Class I (N = 19)		Class III (N = 9)	
Upper quartile	$643		
Median	$375	Median	$90
Lower quartile	$205		

IV. STAFF

1. *Total regular salary budget* (excluding nurse, medical, dental, psychological service, and assistance by the hour)

Class I (N = 31)		Class III (N = 13)	
Upper quartile	$9798		
Median	$4580	Median	$1850
Lower quartile	$2647		

2. *Annual cost of meals served to staff*

Class I (N = 25)	
Upper quartile	$273
Median	$120
Lower quartile	$41

Various schools reported additional expenses for assistance by the hour, special professional services, traveling expense, and miscellaneous items. The number of schools so reporting, however, fell below the mid-point of the distribution and thus did not affect the medians given above. In other words, the additional staff expense over and above the regular salary budget is for the majority of schools reporting either zero or negligible. The one exception is in the case of the cost of meals, and this item is tabulated above.

V. COSTS OF CHILDREN'S FOOD

The annual food costs for nursery schools which furnish dinner to the children are:

Class I (N = 25)

Upper quartile	$992
Median	$695
Lower quartile	$463

The median cost per child per meal is probably not over 21 cents, including cod-liver oil and orange or tomato juice. Of course, serving is done largely by the staff and assistants whose time is not included in this cost.

VI. How expenses are met

The amount of tuition or fee collected per child per year is given below:

Class I (N = 27)		Class III (N = 24)	
Upper quartile	$209	Upper quartile	$116
Median	$100	Median	$58
Lower quartile	$66	Lower quartile	$36

Twenty-five schools of Class I reported a combination of tuition and public school contribution. For these schools the figures are as follows:

Upper quartile	$237
Median	$125
Lower quartile	$81

These fees, however, obviously do not cover the main portion of the cost of nursery school work. A tabulation of the principal items of cost for which data are available indicates that the cost per year per child for the full-day session is about $370. This is a rough approximation, since it was obtained by adding medians for the various items. A similar tabulation of the medians of the total income per child per year gives a figure of $390. Since these two items are totally independent of each other in the questionnaire, it is likely that they are not far from the actual cost. It should be borne in mind that these figures are inflated somewhat by the inclusion of university preschools which carry a certain proportion of research and teacher training load. For parents, the figure of $125 per year is perhaps the most accurate estimate of what they would be expected to pay out, over and above certain things traditionally supplied by school systems or endowments. Like tuitions at other levels of schooling, it is definitely below the total cost of instruction.

Conclusions

(1) A major contributing factor to the high cost of nursery schools is a median pupil-teacher ratio of only 7.

(2) Nursery schools frequently include special services in teaching adults and providing psychological and medical supervision.

(3) The total annual cost of the full-day schools (including dinner) is about $370 per child.

(4) The median annual tuition for full-day schools is $100; for half-day schools, $58.

A SIMPLE TECHNIQUE FOR THE CALCULATION OF CHRONOLOGICAL AGES

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TEACHERS, administrators, and research workers have numerous occasions when it is necessary to calculate chronological ages of school children. Age-grade studies, to determine the extent of proper grade placement of children, continue to be as popular as in former days. With the seemingly ever-increasing use of standard tests, both achievement and intelligence, the task of determining quickly and accurately chronological ages becomes of more importance.

Ages are most commonly calculated so as to be correct to within: (1) one-half a month; (2) one month; (3) three months; and (4) six months. The closeness of the approximation is contingent upon the purpose for which the ages are to be used later. If it is desired to construct an age grade table, it is only necessary to have ages correct to within three months. Should the objective be to locate all children in the various age groups—say for the purpose of determining standard test age norms—then ages need only to be correct to within six months. In connection with the interpretation of both achievement and mental test results, calculated ages should be correct to within one-half a month, if the individual pupil test results are to be studied. When group results alone are to be considered, the obtained ages need not be more correct than to the nearest month.

A multitude of devices have been placed upon the market for the purpose of easing the task which confronts every worker who has numerous chronological ages to be calculated. These devices make claims of greater speed and accuracy over tables constructed at the time and for the purpose that is desired. Naïvely enough, the creators of these devices often claim among their advantages the fact that they may be used over a period of sixty years. This very feature tends to make these devices all the more cumbersome.

The four examples presented are the types most commonly used. A perusal of Tables I, II, III, and IV and the accompanying explanations will quickly make the plan more clear than any amount of discussion. Note that in each table the dates as of which the ages are desired are not the same. Decide the degree of accuracy that you will need and the date as of which the ages are to be calculated, then construct your own tables.

TABLE I

A PROPOSED TECHNIQUE FOR CALCULATING CHRONOLOGICAL AGES CORRECT TO WITHIN ONE-HALF A MONTH

(In example, ages as of February 11, 1930)

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
Jan. 1—Jan. 25	193	181	169	157	145	133	121	109	97	85
Jan. 26—Feb. 25	192	180	168	156	144	132	120	108	96	84
Feb. 26—Mar. 25	191	179	167	155	143	131	119	107	95	83
Mar. 26—Apr. 25	190	178	166	154	142	130	118	106	94	82
Apr. 26—May 25	189	177	165	153	141	129	117	105	93	81
May 26—June 25	188	176	164	152	140	128	116	104	92	80
June 26—July 25	187	175	163	151	139	127	115	103	91	79
July 26—Aug. 25	186	174	162	150	138	126	114	102	90	78
Aug. 26—Sept. 25	185	173	161	149	137	125	113	101	89	77
Sept. 26—Oct. 25	184	172	160	148	136	124	112	100	88	76
Oct. 26—Nov. 25	183	171	159	147	135	123	111	99	87	75
Nov. 26—Dec. 25	182	170	158	146	134	122	110	98	86	74
Dec. 26—Dec. 31	181	169	157	145	133	121	109	97	85	73

EXPLANATION FOR TABLE I

Assuming 30 days in each month, subtract 15 days from February 11, 1930 (date as of which ages are to be calculated). The date obtained, January 26, 1930, indicates that the 26th is the beginning date for each monthly age group. In the same manner add 14 days to February 11, 1930, and the date obtained is February 25, 1930. The 25th of each month is the final date limit for each monthly age group. All birthdays falling on or between the 26th day of one month and the 25th day of the following month, are considered as of the 11th of the latter month. In the first column on the left these date limits are filled in. The first entry is always January 1 to that day in January which is the final limit for each age group, in this case, the 25th. The remaining date groupings are easily filled in so that each group is from the 26th of one month to the 25th of the next month. The last grouping for December will always begin with the beginning date for all age groups and end with December 31.

Estimate a range of years which will include all ages to be calculated. In the case here presented, the estimate is from 1914 to 1923. After having filled in these years you are ready to insert the age equivalents. These may be given in terms of years and months or merely by months as here given. The most simple point of departure is first to place properly the age 10 years. This should be inserted in the intersection of the column and row which is exactly 10 years ago, or row "January 26—February 25," and column "1920." The remaining age equivalents are quickly filled by remembering that for each space to the right or below, the age becomes one month less; and for each space to the left and above, the age becomes one month larger.

TABLE II

A PROPOSED TECHNIQUE FOR CALCULATING CHRONOLOGICAL AGES CORRECT TO WITHIN ONE MONTH

(In example, ages as of Dec. 9, 1929)

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
Jan. 1—Jan. 8	18-0	17-0	16-0	15-0	14-0	13-0	12-0	11-0	10-0	9-0
Jan. 9—Mar. 8	17-10	16-10	15-10	14-10	13-10	12-10	11-10	10-10	9-10	8-10
Mar. 9—May 8	17-8	16-8	15-8	14-8	13-8	12-8	11-8	10-8	9-8	8-8
Mar. 9—July 8	17-6	16-6	15-6	14-6	13-6	12-6	11-6	10-6	9-6	8-6
July 9—Sept. 8	17-4	16-4	15-4	14-4	13-4	12-4	11-4	10-4	9-4	8-4
Sept. 9—Nov. 8	17-2	16-2	15-2	14-2	13-2	12-2	11-2	10-2	9-2	8-2
Nov. 9—Dec. 31	17-0	16-0	15-0	14-0	13-0	12-0	11-0	10-0	9-1	8-0

EXPLANATION FOR TABLE II

Assuming 30 days in each month, subtract 30 days from December 9, 1929 (date as of which ages are to be calculated). The date obtained, November 9, 1929, indicates that the 9th of every other month (beginning with November) is the beginning date for each two months age group. In the same manner, add 29 days to December 9, 1929, and the date obtained is January 8, 1930. The 8th of every other month is then the final date limit for each two months age group. All birthdays falling on or between the 9th of one month and the 8th of the second month thereafter, are considered as of the 9th of the middle month. In the first column on the left, these date limits are filled in. Notice that the first row begins with January 1 in all cases and that the final row ends with December 31 in all cases.

Estimate the range of years which will include all ages to be calculated. In the case here presented, the estimate is from 1912 to 1921. After having filled in these years as in above example, you are ready to insert the age equivalents. These may be given in months, or in terms of years and months, as here given. Insert the age 10-0 (ten years, no months) in the proper place by inspection. The remaining age equivalents are quickly filled in by remembering that for each space to the right or below, the age becomes two months less; and that for each space to the left and above, the age becomes two months larger.

TABLE III

A PROPOSED TECHNIQUE FOR CALCULATING CHRONOLOGICAL AGES CORRECT TO WITHIN THREE MONTHS

(In example, ages as of March 1, 1930)

	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924
Jan. 1—May 31	15	14	13	12	11	10	9	8	7	6
June 1—Nov. 30	14½	13½	12½	11½	10½	9½	8½	7½	6½	5½
Dec. 1—Dec. 31	14	13	12	11	10	9	8	7	6	5

EXPLANATION FOR TABLE III

Assuming 30 days in each month, subtract 90 days from March 1, 1930 (date as of which ages are to be calculated). The obtained date, January 1, 1930, indicates that the first of each sixth month is the beginning date for that age period. In the same manner add 89 days to March 1, 1930, and obtain the date May 30, 1930. Whenever the final date limit falls on the 30th day of a month having 31 days, the final date limit should be changed so as to include the additional day. In the example presented the date becomes May 31, 1930. All birthdays falling on or between January 1, and May 30, 1930, are considered as of March 1, 1930.

As in Tables I and II, fill in the appropriate age equivalents. Time is saved by merely recording by years and half-years.

TABLE IV

A PROPOSED TECHNIQUE FOR CALCULATING CHRONOLOGICAL AGES CORRECT TO WITHIN SIX MONTHS

(In example, ages as of May 11, 1930)

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Jan. 1—Nov. 10	17	16	15	14	13	12	11	10	9	8
Nov. 11—Dec. 31	16	15	14	13	12	11	10	9	8	7

EXPLANATION FOR TABLE IV

Assuming 30 days in each month, subtract 180 days from May 11, 1930 (date as of which ages are to be calculated). The obtained date, November 11, 1929, is the beginning date of the period considered being as of May 11, 1930. The final period is obtained by adding 179 days to May 11, 1930, and November 10, 1930, is obtained. All birthdays falling on or between November 11, 1929 and November 10, 1930 are considered as of May 11, 1930. As in previous tables fill in the appropriate age equivalents.

EDITORIALS

PLANNED PROGRAMS OF RESEARCH

Recently the leader of a group of Australian educators, making a study of American schools, commented on the relative inefficiency of the individualized program of research characteristic of most of our scientific studies, and described a proposed program of research to be undertaken in Australia under the central governmental authority. He pointed out that, by and large, in this country there is no method of coördinating research on educational and related problems. Each individual research worker attempts to carry on an independent piece of research of his own choice which may in fact be duplicated in a dozen different places at the same time without his being aware of it. Much of the research is futile because it is not well planned and often entirely unsupervised. It may have little bearing on what are the crucial issues of the present. The results, as he sees them, are gross inefficiency, waste of energy and time, and slow progress, if any.

The proposed program of research under the plan developed in Australia, where at present there is little educational research, is to have a central committee under the direct auspices of the governmental authorities outline a program of the major problems relative to education in that country which, in their opinion, should be investigated. The best brains of the country would be consulted in this connection. This program would serve as a framework for the research activities to be undertaken under the auspices of the government. Individuals throughout the several states would be expected to coöperate under the supervision of the committee in charge in the systematic study of the various problems.

As an illustration of the efficiency of such a plan, it was stated by the speaker that in connection with a proposed testing program the procedure would be simply to direct that the necessary tests be given in the schools which were selected for the purpose by the central authority. There would be no need of appealing to the various schools for grudging help as must so often be done in this country. There was also definite assurance that the results of the tests would reach the surveying committee, because of the direct authority of the investigating body. Similarly, in connection with any experimental study involving a problem of sampling the central authorities would make the necessary selection of schools from various parts of the country. In short, in Australia it is proposed to develop a planned program of research which would coördinate the work of the various individuals and direct it toward goals set up by the educational authorities with the help of leaders in the field.

Both the American and Australian plans have their advantages as well as disadvantages. One need but survey the wide variety of research that has been undertaken in this country to appreciate that the independent worker has made large contributions to the body of available scientific information dealing with educational problems. In many fields there have been highly important findings that have been incorporated into our educational practices. The independent worker has felt free to explore leads of interest to himself. It must be admitted that some of these studies have not appeared to be immediately pertinent; however, one must admit that this may be because of our inability to see the possible relationships rather than the lack of value of the findings.

That the limitations of the American type of independent, individualized research have been recognized is shown by the growth of coöperative types of studies in this country in which relatively large groups of individuals participate in the study of educational problems. Such investigations as the national surveys of secondary education, teacher training, and school finance under the auspices of the Office of Education come to mind. Back of them there is no direct authority although they are subsidized by government funds. The data these surveys collect must be supplied voluntarily by those who are asked to aid in the investigation. Each group directly in charge of the study has the benefit of advice from an advisory board of specialists in the field. The general response by workers in the field has apparently been cordial, and facts of vital importance will be made available. Practices will undoubtedly be modified. In scattered places similar types of voluntary coöperative research are being undertaken, but there is no national or even state plan.

These national coöperative investigations have dealt largely with administrative problems. They were concerned with fact finding rather than with evaluation. The necessary experimental work on the basis of which evaluations might be possible demanded resources and energy beyond the limits of the groups in direct charge of these several studies. In fact the Office of Education adopted the policy of not attempting to evaluate practices, since to do so might result in the wide acceptance of conclusions not validated by experimental studies.

It would appear that any attempt to evaluate current practices in a wide variety of schools, colleges, and universities throughout the country will require the coöperation of many persons and institutions. The need for such an evaluation is obvious if there is to be intelligent direction. The question is: Are we ready and willing to develop such a voluntary coöperative program of experimentation necessary for evaluation and to undertake the intensive work that would be demanded? Many readjustments would need to be made; many personal interests would need to be sacrified; in some quarters there would be demanded a type of analytical objective thinking to which individuals are wholly unaccustomed.

A combination of the American and proposed Australian plans seems highly desirable. On the one hand, one would want to do nothing to

crush the fine spirit of independent individual research which has resulted in the development of an ever-growing body of educational truth. On the other hand, there is every reason to believe that a planned program of coöperative research dealing with crucial issues in present day education would be most helpful. This end might well be accomplished through the coördinated action of the various scientific bodies, both state and national, dealing with aspects of educational problems. The accomplishment of such an end demands real educational statesmanship. Unless this is done the alternative may be the establishment of some central authority which might arbitrarily take upon itself the setting up of standards and criteria for evaluation.

LEO J. BRUECKNER

REVIEWS

Address all communications relative to book reviews to Editor E. J. Ashbaugh, Miami University, Oxford, Ohio.

DUNLAP, JACK W., AND KURTZ, ALBERT K. *The Handbook of Statistical Nomographs, Tables, and Formulas.* Yonkers-on-Hudson, New York: World Book Company, 1932. 163 pp.

This is a book that statistical workers who set a high value on their time are likely to keep near their elbows. A terse summary of the volume is contained in the quotation fittingly printed on the flyleaf: "Dost thou love life? Then waste not time, for time is the stuff that life is made of."

The most creative portion of the book is the collection of 28 nomographs, drawn with precision, and capable of yielding results with great speed and with at least as much accuracy as is warranted in most studies. A pinhole in the celluloid ruler provided makes it possible for some of these nomographs to perform the work of an abacus, thus achieving a considerable saving of eyesight. The instructions have been written with clarity and simplicity so that these charts can be used by any careful person whether he understands the general basis of nomography or not. A good deal of thinking seems to have been devoted to forestalling possible misuse of the charts, and warnings have been posted for the unwary.

Most of the 12 tables in the second part of the book are not new, but without them the handbook would lose a good deal of its usefulness. The sources from which tables have been drawn are acknowledged and have been carefully checked, and in some cases extended, by re-computation. While this section is indispensable to the general utility of the book, it will not add greatly to the equipment already possessed by most computers.

The third section presents a list of 417 statistical formulas, with a brief verbal description of each, the names of publications in which the formula is presented, and references to those tables and nomographs in this volume which are helpful in computations involving that formula. This list meets a real need, because it enables one to find immediately the formula he desires without a time-consuming search through the indexes of many books. Its value would have been enhanced, in my opinion, if the writers had felt they could discriminate in some way among these formulas, instead of including without comment everything which was found in any of the sources examined, even when a formula represents a technique not employed by well-trained statisticians. Probably no two persons could agree on a list of books which ought to be covered in such a study of published formulas, and the rapidity with which the literature of the field is growing makes it humanly impossible to survey all the important sources, but I regret the omission of certain books from the list: notably, Elderton's *Frequency Curves and Correlation*, Ezekiel's *Methods of Corre-*

lation Analysis, and Holzinger's *Statistical Methods for Students of Education*. The uniform notation in which these formulas are set down is admirable; superior, I think, to the notation used in any single text now available in that it is unequivocal, each symbol having only one meaning; it is flexible, allowing for the invention of new terms within the system; it has a symmetry and logic which make it easily remembered once the guiding principles are understood and which make it simple enough to be readily understood by anyone who can understand the concepts of statistics; and it takes account of historical precedent where that is firmly established. Some way out of the present babel which our statistical language presents is urgently needed, and this seems to be a promising movement in that direction.

Another commendable feature of the book is the ease with which material can be located. This is due to the innovation of numbering both charts and tables to agree with the number of the page on which they are found. A work of this scope could scarcely escape having some errors, but as yet I have failed to discover them.

HELEN M. WALKER
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WRINKLE, WILLIAM L., AND ARMENTROUT, WINFIELD D. *Directed Observation and Teaching in Secondary Schools*. New York: Macmillan Company, 1932. xvi + 399 pp.

The authors of this excellent manual are convinced that actual attempts to learn to teach by teaching should be preceded by careful study, analysis, and evaluation of some of the fundamental processes. Upon the basis of this principle, they have worked out a very carefully organized series of lessons in which the student first gains the main ideas connected with the study-observation topic, then turns to observation as a means of vitalizing what has been studied. Nothing is left to chance. The scheme of organization provides, first of all, for a clear statement of the main problem to be studied, and then for a list of subordinate problems. A discussion of these problems follows. The student thus has before him a statement of important ideas that will help him in understanding what the teacher is trying to do and in knowing what to look for during the observation. But to make assurance doubly and trebly certain, the authors add a vocabulary of educational terms to each chapter, and with that a directed study test,—altogether a very elaborate study apparatus. Then there follows two assignments, one for directed observation and the other for directed teaching.

The quality and scope of this book (which is much more than a series of observation outlines such as the reviewer himself used many years ago) may be judged by these two facts: (1) The title as it stands is strictly applicable; and (2) an equally accurate title would be *Principles of Education and How to Observe Them in Operation*. Consequently Messrs. Wrinkle and Armentrout have made a real contribution to the solution of that puzzle which has worried all educators who have attempted to make use of observation in the training of teachers: the twofold puzzle of using principles to enlighten the darkness of observation and of using observation to give genuine vitality to principles.

The only change which the reviewer considers desirable is in the arrangement of chapters. Classroom Management (Chapter II) and Discipline (Chapter XIV), instead of being separated by

...bout three hundred pages, might well be ...laced together and treated as two ...hases of a single idea.

C. L. ROBBINS

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OVERMAN, JAMES ROBERT. *An Experimental Study of Certain Factors Affecting Transfer of Training in Arithmetic.* Baltimore: Warwick and York, Inc., 1931. vii + 235 pp.

This volume is the report of a careful study of the effects of transfer as related to certain types in the addition and subtraction of whole numbers. The book opens with an excellent review of previous contributions in the field. The second chapter relates to purpose and method. The investigation "was planned to study the effect of instruction on three types of examples in two place addition upon the pupils' ability to handle closely related types in three place addition and in two and three place subtraction, and to determine whether the amount of transfer is a function of the method of teaching."

Data were gathered relating to transfer in connection with four types of teaching: Method A, by teaching with neither generalization nor rationalization; Method B, by helping the pupils to consciously generalize the process and formulate from the three types taught a general method of procedure applicable to the related types; Method C, by rationalizing the process, that is, by considering the underlying principles; and Method D, by a combination of generalization and rationalization.

Data were also afforded with reference to the relationship between the amount of transfer and mental age, with reference to sex differences in transfer, and with reference to the relationship between the loss in transfer and dissimilarity between the types. These four methods of teaching and the types taught are described and exemplified in detail.

The study involved 448 pupils who were taught by fifty different teachers in three Ohio cities. The study was carried on by means of control and experimental group technique. The preliminary knowledge of pupils was carefully measured and special pains were taken to match the pupils properly. The variable injected into the problem because of the fifty different teachers was taken care of by means of explicit directions for teaching and carefully conducted conferences with the teachers.

The results show that all four methods were "about equally effective concerning the transfer for those types of examples which did not involve the difficulty of placing numbers having different numbers of digits. Methods B and D were almost certainly, and Method C was possibly more effective than Method A in producing transfer to those types of examples involving the placing of numbers having different numbers of digits." Method B increased the transfer by 45.1 percent; Method C increased it 15.5 percent; and Method D increased it 36.9 percent.

No differences of major significance were found in transfer in relation to sex. There was an increase in the amount of transfer with the increase in mental age. This increase was greatest with Method B and least with Method A. No certain differences were found between the transfer produced by the different methods on the two lower levels of mental age. Loss in transfer is related directly to intrinsic difficulty of the untaught types and to the degree of dissimilarity between the untaught types and those which were taught. There was considerable evidence of the ill-effects of harmful transfer which was disclosed through a study of errors.

The study as a whole is of major importance in correcting the notion that has been prevalent to the effect that the amount of transfer is either small in amount or actually nonexistent. This study should finally set us straight and impress upon us the fact that the amount of transfer may be very large and that transfer is a most important problem for further study. The present investigation shows clearly that when we teach two place addition we are also in large measure teaching three place addition.

These phases of addition constitute only a small portion of the field of arithmetic as a whole. When studies of this sort have been made with reference to scores of other types of arithmetic exercises, we can at least begin to talk with conviction about how to eliminate waste in education. It is the belief of the reviewer that studies of transfer in the future will yield to us our most important clue to this most urgent problem. Further studies of this sort will also yield the long needed means of evaluating different methods of teaching. As a pioneer effort in this important field, the present contribution merits the careful attention of all those who would speak with certainty with reference to transfer of training.

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SMITH, DORA V. *Class Size in High School English.* Minneapolis: The University of Minnesota Press, 1931. xii + 309 pp.

Over a period of time interesting cycles or reversals of trends in educational methodology may be observed. The same characterization, however, may be applied with equal truth to other professions and fields of knowledge. In some instances these cycles in educational procedure are the result of adopting a fad which is soon discarded. In other cases change in methodology is based on painstaking investigation and experimentation. Frequently a new movement passes through at least three stages: first, vigorous opposition; second, uncritical acceptance in many quarters, and third, a critical period of testing and evaluating. Examples are mental testing, project teaching, and individual instructing.

Class-size theory has an interesting history. In the classrooms of the monitorial schools of more than a century ago were as many as 500 or even 1000 children. This system was followed by the popular Pestalozzian methods which required smaller groups. Of late, a number of experiments, especially at the University of Minnesota, have been concerned with the merits of large versus small classes.

One of the most interesting and significant of the class-size studies has been made by Dora V. Smith, in the University High School of the University of Minnesota. Two classes in ninth-grade English were used during each of two school years, a control group of twenty pupils in 1925-26 and a control group of twenty-one in 1926-27 and experimental groups of forty-eight and fifty-one pupils, respectively. Pupils in the small groups were paired closely with pupils in the large groups in terms of intelligence, sex, chronological age, and specific abilities in English. Progress during the two-year period in terms of the means of both groups on twenty-four objective measures of eight different aspects of the course in English indicates that efficiency of instruction was independent of the size of class in grammar, punctuation, capitalization, mechanics of reading, and composition, exclusive of letter writing. The small classes were definitely superior in letter

writing and library methods. Large classes were decidedly advantageous for progress in spelling, increase of vocabulary, knowledge of literature, and extent and variety of reading activities, including initiative in unsolicited contributions to classroom projects, amount of voluntary reading, and general spirit and enthusiasm for the work. Pupil attitude toward large classes became increasingly favorable as the experiment progressed, although six months after the initiation of the study sentiment was about evenly divided between preference for large and small classes. The testimony of teachers and observers with respect to the reactions of pupils in terms of monopoly of discussion, unnecessary questions, eagerness to recite, interest and enthusiasm, and initiative and originality favored the larger classes.

The book includes an excellent summary of some forty studies of class size. A helpful part of the investigation deals with techniques of instruction adapted to larger groups. The appendix includes sixty-nine pages of tests and devices used in the experiment and a bibliography of thirteen pages.

One of the most frequent criticisms of class-size investigations has been that the objective tests used to measure results cover little except factual information. It is claimed that much is gained from direct personal contacts between pupils and teacher in small classes and from certain socializing and stimulating factors supposedly operating in small groups. The present experiment, in spite of the small numbers involved, offers evidence of significance in refuting such claims. For the present at least, advocates of small classes necessarily are placed on the defensive and the pendulum of educational methodology and administration swings in a different but not new direction.

CARTER V. GOOD
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ENGELHARDT, FRED. *Public School Organization and Administration*. Boston: Ginn and Company, 1931. xvi + 595 pp.

This book covers the entire field of city school administration, with some reference to rural, county, and state problems, particularly where there is an important relationship in question, such as the relation of the city district to the state in matters of jurisdiction or finance.

The preface of the book states that "this treatise deals largely with the principles of organization and administration of school districts." While this is especially true of a few of the chapters and partly true throughout, the writer was more impressed with the large amount of discussion of the concrete aspects of organization and administration and the citation of cases of how things are being done in American city school systems. Yet, the book is by no means a mere manual of the duties of officers and description of forms of organization and procedure.

Business as well as educational aspects of administration are wisely dealt with, without attempting a full treatment of the field of school business management. The chapter titles and the organization of the book are logically arranged and reflect somewhat the structure of a school system, yet the discussion centers well about the functions for which the structure exists. "Organization for Supervision" (Chapter XII) for instance, is much more than a discussion of a set-up for such a department. The chapter on the "Program for Health Education" makes clear what this health service is, and so in most chapters the service to be

administered is not taken for granted or neglected in favor of a bare description of the administrative mechanism.

The author's conception of administrative responsibility and of its distribution and application throughout a school system appears to be in line with the accepted practice of today. Yet, the historical background is not overlooked, and nowhere is it implied that the practices described are to be regarded as a final disposition of the problems in question. Rather, the student will more likely feel that school administration is in a continuous state of experimentation, and, in the nature of things, must remain so.

The book contains and makes effective use of much graphic and tabular material from public school and other publications descriptive of present day practice and illustrative of the administrative organization and principles under discussion. A wealth of reference material is made available in footnotes and bibliographies, and for each chapter a useful list of topics and problems for class use has been added.

If the book has a weakness as a class text it is probably in its too liberal offering of excellent materials and at some points in a too extended discussion, both useful weaknesses where extensive library facilities are not available. Like other recent books in this field this one shows that school administration is a very large subject and points to the necessity for specialization in university courses in administration.

JESSE B. SEARS
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ENGELHARDT, FRED. *Public School Organization and Administration.* Chicago: Ginn and Company, 1931. xvi + 595 pp. *Public School Organization and Administration Syllabus.* Chicago: Ginn and Company, 1930.

The above text is well filled with the modern principles of management that are essential to the success of a public school system. Some attention is paid to the historical and related aspects as well as the newer developments which have modified public school administration.

The textbook and the syllabus form an admirable basis for a discussion of the general principles that should determine the educational policies of school administrators.

Besides the solid content of reading matter found in this text there are 161 tables and 66 figures and diagrams. The thought provoking questions and topics for investigation together with the bibliography at the end of each chapter make this book an outstanding contribution to the text materials for administration courses. The syllabus also has new type test forms which cover the assigned materials and may be used for teaching as well as testing purposes.

No doubt, teachers of administration will welcome this scholarly book on administrative problems. It takes, after all, considerable intelligence to apply broad educational policies to specific administrative situations, and whether it is more conducive to sound administration to teach the specific "tricks" of the job or to build up a philosophy of educational administration seems to be a mooted question among so-called authorities.

J. W. TWENTE
University of Kansas

ARRINGTON, R. E. *Interrelations in the Behavior of Young Children.* New York: Bureau of Publications, Teachers' College, Columbia University, 1932. xvii + 156 pp.

Captured by the promising title of this publication, a reader who expects to find new data on behavior interrelations will

be disappointed, after covering 156 pages, to discover only five pages of very tentative findings, devoted to the topic indicated in the title. Dr. Arrington's monograph, however, should be considered as essentially a contribution to method, and as such it will be found of definite value to research workers in certain fields, particularly in nursery schools. The method presented involves the use of schedules for recording, in five second periods, "physical activity," "talking to self," "use of material," "physical contacts," laughing and crying. Simultaneous records are required, by persons observing different phases of the child's behavior. As in other studies of this type, emphasis is given, not to experimental control of the child, who is left free to follow his own play inclinations, but to careful prescription of the technique of observing and recording. The author states: "The inevitable margin of observational error can be reduced to a minimum by repeated redefinition of categories and elimination of the sources of bias, and the human observer can become a relatively standard measuring instrument." It is, of course, obvious that behavior categories can be defined so minutely that there will be very few common elements with any other aspects of behavior. The search for the specific may lead to a descent into the inconsequential. In the present instance the conduct observed has the appearance of being of genuine significance, and we shall await with interest further empirical demonstration of the diagnostic and predictive value of these measurements.

HAROLD E. JONES
University of California

WOMRATH, GEORGE F. *Efficient Business Administration of Schools.* Milwaukee: Bruce Publishing Company, 463 pp.

This treatise is one of unusual merit. It is sound in its educational philosophy and accurate from a technical standpoint. It probably might better be designated "The Efficient Administration of the School Plant" rather than the "Efficient Business Administration of Schools," since it treats exhaustively every activity connected with the school plant but omits other business activities not intimately connected with plant management.

Written by one of the outstanding school business executives the book is thoroughly sound in its philosophy of administration. This superintendent is everywhere recognized as the chief administrative officer of the school system. He it is who delegates authority to competent assistants and appraises their work. But he must be thoroughly familiar with the specific requirements of that office.

Everywhere recognition is accorded to the prime function of the school system, viz., the efficient education of the children. The educational specifications of a school plant and its equipment are prepared by the educational executives and precede the architectural and engineering specifications. The budgeting and purchasing of supplies is dependent upon the needs of the pupils. Sane economies suggested in connection with the construction of the school plant and its operation are always suggested with due attention to their effect upon the educational program.

As a whole, the book is scientific and objective. Where technical instruments are available their use is suggested. Score cards and checking schedules are repeatedly recommended. In several instances it outlines original scientific contributions by the author. The indexes of population set up for plant planning, the method of allocating insurance, the com-

parative economy of low pressure vs. high pressure boilers, are instances in point.

The general form of the book is commendable. It is well printed, substantially bound, and adequately indexed. An excellent feature is the asking of pertinent questions which are printed in italics and followed by the answers.

This book will fill a place among school executives and school board members not occupied by any other work.

Syracuse University H. P. SMITH

DEPUTY, ERBY C. *Predicting First-Grade Reading Achievement.* New York: Bureau of Publications, Teachers College, Columbia University.

The purpose of the study reported in this monograph is "to develop a test that can be used instead of or in connection with a test of intelligence for the purpose of determining which pupils have the ability necessary to be successful in the first semester of reading." The results show that the series of tests so developed have a correlation of 75 with actual first grade achievement in 103 cases as shown by weighted scores.

Much skill is shown in the construction and administration of the individual tests. These are four in number: Visual-visual association; word selection; visual-auditory association; and content comprehension and recall. Special tests were also constructed to measure reading achievement twice during the semester, this being necessary because the vocabulary taught differed so markedly from any standard test vocabulary. The Pintner-Cunningham Primary Mental Test was given at the beginning of the semester, and the Detroit Word Recognition Test at the close. Results from both these sources are correlated with the results of the original tests.

There is no more crucial problem facing first grade teachers, supervisors, and administrators than the need to discover early those children who are ready for reading, and to develop a wholesome program for those who are not ready. The study here reported emphasizes this need and is a step in the solution of the problem. Since the tests of reading readiness, however, are individual in character, requiring "forty-five minutes on the average for each child," they are likely to prove more valuable in laboratory schools and clinics than in large school rooms. The correlation of the Pintner-Cunningham Primary Mental Test, a group test, with reading achievement is 70 as shown in this study. This result seems to be exact enough for general purposes. In special cases the added certainty of the new tests will be of definite help.

Comparing the results of individual tests with the results of group achievement tests may result in a higher correlation than would have been obtained if the achievement tests had been of an individual character. Individual tests were given to the lowest 33 cases. It is interesting to note that the school machinery required that even those making the lowest scores should continue in their efforts to learn to read. To parody the old rhyme,

> "Ready or not,
> Ready or not,
> Ready or not,
> You shall be taught."

Better practice depends upon continued study of the problem.

FRANCES JENKINS

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RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to Editor A. S. Barr, University of Wisconsin, Madison, Wisconsin.

BULLETINS AND RESEARCH MONOGRAPHS

AYER, FRED C. *The Progress of Pupils in the State of Texas,* Research Bulletin of the Section of Superintendence, Texas State Teachers Association (November, 1932), 35 pp.

This bulletin contains a statement of the problem and the rate of promotional progress in relation to the size of cities, of semi-annual promotion, of common school districts, of entrance age, etc. Sample census, classroom, individual cumulative, and office records are given.

BLAKEY, ROY G. *The State Income Tax,* University of Minnesota Studies in Economics and Business (Minneapolis: The University of Minnesota Press, 1932), viii + 88 pp.

After setting forth the criteria of a good tax system, the author discusses the state income tax in Minnesota, discussing the chief features of state income taxes, the administration of state income tax laws, the operation and effects of income taxes, and the probable results in Minnesota. Bibliography.

FRANZEN, RAYMOND. *Influence of Social and Economic Factors on the Health of the School Child,* School Health Research Monographs, No. IV (New York: American Child Health Association, 1932), xiv + 144 pp.

Contains a discussion of socio-economic influences and the school health program, school health study measures of socio-economic forces, tests of the results of health programs, trends in the measurements associated with sequence in administration, socio-economic causes of health behavior, socio-economic causes of other school health results, the socio-economic residuals, and further objectives of the school health study. There are appendices containing a description of measures, basic data, and statistical techniques.

GRIFFITHS, D. C. *The Psychology of Literary Appreciation,* Educational Research Series, No. 13 (Melbourne, Australia: Melbourne University Press, 1932), 142 pp.

Contains a discussion of the origin of literature, reason, and imagination in literature, imaginative activity during appreciation, the aesthetic mode of experience, literature as relaxation and adjustment, expression, details of form, the sense of beauty, the influence of environment on appreciation, educational significance, and the experimental approach. Bibliography.

Index Translationum: International Bibliography of Translation (Paris: International Institute of Intellectual Coöperation, 1932), 54 pp.

A quarterly publication listing the translated words appearing in the principal countries. The first number gives a list of translations published in France,

Germany, Great Britain, Italy, and the United States.

JENSEN, KAL. "Differential Reactions to Taste and Temperature Stimuli in Newborn Infants," *Genetic Psychology Monographs*, XII (November-December, 1932), 112 pp.

The author presents a statement of the problem, the historical review of the problem, the apparatus and procedure employed in the investigation, his data, and conclusions. The author presents the conclusion in a series of 54 statements, setting forth the reactions of newborn infants and temperature stimuli. Bibliography.

KUNZIG, ROBERT W. *Public School Education of Atypical Children*, United States Department of Interior, Office of Education, Bulletin, 1931, No. 10 (Washington: United States Government Printing Office, 1931), v + 160 pp.

Contains a statement of state laws, state organization and administration, statistics of educational provisions, and cost of education for atypical children. Bibliography.

LINDEGREN, ALINA M. *Institutions of Higher Education in Sweden*, United States Department of Interior, Office of Education, Pamphlet No. 32 (Washington: United States Government Printing Office, 1932), v + 45 pp.

The purpose of this pamphlet is to present to college registrars, committees of admission, and state departments of public instruction such data about the institutions of higher education in Sweden as will enable those officials and offices to form fairly accurate judgments of how higher training in Sweden compares with that in the United States.

LUSH, M., AND OTHERS. *The Growing Child*, Educational Research Series, No. 12 (Melbourne, Australia: Melbourne University Press, 1932), 72 pp.

A series of five lectures on child management: the child in the family, the child at school, the child and the community, the importance of habit, and the growth of character.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

DOLL, EDGAR A. "The Problem of the Feeble-Minded in New Jersey, the Relation of the Public Schools to the Public Institutions," *The Training School Bulletin*, XXIX (November, 1932), pp. 125-132.

The author presents a discussion of the relation of the public schools to the public institutions for the feeble-minded in New Jersey, setting forth the problem, the number of feeble-minded, the number among children, existing provisions, social types of feeble-mindedness, and the public school problem.

KEYS, NOEL, AND NATHAN, JEANETTE M. "Occupations for the Mentally Handicapped," *Journal of Applied Psychology*, XVI (October, 1932), pp. 497-511.

From a study of 2755 positions held by graduates of the ungraded classes for the mentally deficient pupils in the San Francisco public schools and similar groups in other parts of the country, the author concludes that a large proportion of the tasks in the modern organization of industry can be performed by individuals of the 70 and 75 I.Q. class as well as by those of superior intelligence, and with more satisfaction in the performance.

McElwee, Edna Willis. "A Study of Mechanical Ability and Homogeneous Grouping," *Journal of Juvenile Research*, XVI (October, 1932), pp. 304-309.

From a study of 225 boys and 225 girls, in grades 2A to 4B inclusive at Public School 208, Brooklyn, New York, the author concludes that the homogeneous classification of children on the basis of intelligence as now employed in many schools does not really solve the problem.

Steinmetz, Kathryn E. "Departmentalization in the Junior High Schools of Chicago," *School Review*, XL (December, 1932), pp. 760-771.

A study of the practices of the twenty-seven junior high schools in the city of Chicago.

PSYCHOLOGY OF LEARNING AND TEACHING

Barr, A. S., and Park, John S. "An Experimental Study of Functional Learning," *Journal of Experimental Education*, I (September, 1932), pp. 9-18.

An experimental study of functional learning in which the authors employ the rotated group type of experimentation in the learning of an artificial alphabet.

Burge, Lofton V. "Types of Errors and Questionable Habits of Work in Multiplication," *Elementary School Journal*, XXXIII (November, 1932), pp. 185-194.

From a study of the test papers of 2110 pupils in five public school systems in Michigan, the author concludes that errors persist throughout the higher grades and have significance for the individual pupil regardless of their frequency.

Cason, Hulsey, and Lungren, Frances Clara. "Memory for Pleasant, Unpleasant, and Indifferent Pairs of Words," *Journal of Experimental Psychology*, XV (December, 1932), pp. 728-732.

The authors find little or no relationship between the memory for pleasant, unpleasant and indifferent pairs of words.

Clemenson, Jessie Williams. "Study Outlines in Physics—Construction and Experimental Evaluation," *Science Education*, XVI (December, 1932), pp. 453-461.

The author presents an experimental study of study outlines in physics from which she concludes that the three types of measures used to evaluate the results of the experiments gave consistently positive results in favor of the outline.

Davis, Alonzo J., and Meenes, Max. "Factors Determining the Relative Efficacy of the Whole and Part Methods of Learning," *Journal of Experimental Psychology*, XV (December, 1932), pp. 716-727.

The author tests out the relation of a number of factors, such as, place association; time; habitual methods of learning; age, sex, and capacity; and the relative effectiveness of the whole and part methods of learning, concluding that these factors, with the possible exception of sex, are not determining factors.

Davis, Robert A., and Ballard, C. R. "The Effectiveness of Various Types of Classroom Incentives," *Educational Method*, XII (December, 1932), pp. 134-145.

The authors present a summary of forty-two experimental studies dealing with the matter of incentives, indicating

in tabular form the experimental factors, the method, and the findings.

FRANDSEN, ARDEN. "The Rôle of Affective Tone in Learning to Spell," *Journal of Educational Psychology*, XXIII (November, 1932), pp. 625-631.

The author finds little or no relation between efficiency of children in spelling and the pleasantness or unpleasantness of the words.

HILGARD, JOSEPHINE ROHRS. "Learning and Maturation in Preschool Children," *Journal of Genetic Psychology*, XLI (September, 1932), pp. 36-56.

From a study of two matched groups of ten children each, ages 24 to 36 months, in the Merrill-Palmer Nursery School, the author found that the non-practice group after one week of training performed the tasks employed in the test as well as those who had practiced twelve weeks.

LESTER, OLIVE P. "Mental Set in Relation to Retroactive Inhibition," *Journal of Experimental Psychology*, XV (December, 1932), pp. 681-699.

The main outcome of the experiment is its demonstration that direction establishing a mental set at the time of learning has the effect of minimizing retroactive inhibition.

MALLER, JULIUS B., AND ZUBIN, JOSEPH. "The Effect of Motivation Upon Intelligence Test Scores," *Journal of Genetic Psychology*, XLI (September, 1932), pp. 136-151.

An experimental study in which the authors find that the repetition of an intelligence test under a very strong incentive of rivalry caused no greater gain in score than repetition under normal conditions.

MANWILLER, C. E. "Growth in Reading in the Pittsburgh Public Schools, Grades 4-8," *Pittsburgh Schools*, VII (November-December, 1932), pp. 116-127.

The author presents an analysis of the results of the Sangren-Woody Reading Tests administered at the beginning and end of a period of remedial instruction in reading.

MCGEOCH, JOHN A. "The Comparative Retention Values of a Maze Habit, of Nonsense Syllables, and of Rational Learning," *Journal of Experimental Psychology*, XV (December, 1932), pp. 662-680.

The author finds that materials that are verbal and ideational in character are better retained than motor maze habits.

THOMSON, EDITH I. M. "A Study of the Efficiency of 'Individual Work,'" *British Journal of Educational Psychology*, II (November, 1932, pp. 257-275.

An experimental study of individual work in which the author obtained superior results, as measured by the new Stanford Achievement Test, by the individual method.

TOLMAN, E. C., HALL, C. S., AND BRETNALL, E. P. "A Disproof of the Law of Effect and a Substitution of the Laws of Emphasis, Motivation, and Disruption," *Journal of Experimental Psychology*, XV (December, 1932), pp. 601-614.

An experimental study of the law of effect in which the authors offer evidence

to disprove the law of effect for which they substitute the laws of emphasis, motivation, and disruption.

WYLIE, CARRIE LEE. "An Experiment in the Teaching of First Semester Algebra," *Pittsburgh Schools*, VII (November-December, 1932), pp. 95-115.

An experimental study of the relative effectiveness of the unit and subject plan of instruction from which the author concludes that the subject plan of instruction is superior to the unit plan.

CURRICULUM CONSTRUCTION

BENNETT, EARL E. "What High-School Pupils Read in School Papers," *School Review*, XL (December, 1932), pp. 772-780.

A questionnaire study of what 17,853 Western Pennsylvania high-school pupils read in school papers.

SHELDON, DONALD R. "Children's Interests," *Elementary School Journal*, XXXIII (November, 1932), pp. 205-214.

A study of children's interests in various occupations, recreational activities, home activities, school subjects, school and community activities, secured by means of a test given to the children in grades 4 to 8, inclusive, in eight Arizona communities.

THOMAS, CORONAL. "A Comparison of Interests of Delinquent and Non-Delinquent Boys," *Journal of Juvenile Research*, XVI (October, 1932), pp. 310-318.

The author presents the results of a questionnaire study of the interests of delinquent and non-delinquent boys. The questions were presented to groups of children in and about the city of Detroit.

MEASUREMENT, STATISTICS, AND METHODS OF EDUCATIONAL RESEARCH

FRANZEN, RAYMOND, AND DERRYBERRY, MAHEW. "Reliability of Group Distinctions," *Journal of Educational Psychology*, XXIII (November, 1932), pp. 586-593.

The authors show that the precision of a test is not always better for groups than it is for individuals. The reliability of the materials with different kinds of groupings must be determined.

GRIFFIN, HAROLD D. "How to Construct a Nomogram," *Journal of Educational Psychology*, XXIII (November, 1932), pp. 561-577.

The author traces the history of the nomogram, the principle of the nomogram, and steps in its construction. Bibliography.

NEMZEK, CLAUDE L. "The Constancy of the I.Q.'s of Gifted Children," *Journal of Educational Psychology*, XXIII (November, 1932), pp. 607-610.

The author finds the correlations between the repeated I.Q. ratings of gifted children to be lower than those reported by other investigators.

NYGAARD, P. H. "Interpretation of Correlations on the Basis of Common Elements," *Journal of Educational Psychology*, XXIII (November, 1932), pp. 578-585.

The author gives a statement of the theory of correlation based upon common elements with a discussion of its application to the Spearman two-factor theory.

STAGNER, ROSS. "The Intercorrelation of Some Standardized Personality Tests," *The Journal of Applied Psy-*

chology, XVI (October, 1932), pp. 453-464.

The author presents the intercorrelation for six objective personality tests. The correlations are uniformly low.

WELLMAN, BETH L. "Some New Bases for Interpretation of the I.Q.," *Journal of Genetic Psychology*, XLI (September, 1932), pp. 116-126.

From repeated measures of pre-school children the author finds that preschool attendance causes a rise in the I.Q., the rise being cumulative from year to year, and sustained throughout the elementary school period.

MISCELLANEOUS PAPERS

BISSET, LEE, AND LASLETT, H. R. "A Study of Height, Weight, and Age Among High School Boys," *Journal of Juvenile Research*, XVI (October, 1932), pp. 291-297.

The authors present the results for 1850 boys in the Oakland (California) Technical High School, from which they conclude that the amount of overlapping is so great that statements that a pupil is overweight or underweight should be made with great caution. In general, only a pupil who deviates from the mean for his age by two or more standard deviations should be classified as extreme.

FELDER, JEAN GRANGER. "Some Factors Determining the Nature and Frequency of Anger and Fear Outbreaks in Pre-School Children," *Journal of Juvenile Research*, XVI (October, 1932), pp. 278-290.

The author finds that the four main causes for outbreaks of anger and fear are: (1) force of competition, (2) ignoring, (3) intervention of the observer, and (4) realization of failure of the method employed.

RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Editor Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.

DOCTORS' THESES UNDER WAY IN EDUCATION, 1932-1933

CARTER V. GOOD
University of Cincinnati

THIS, the third annual list of Doctors' theses under way in education, is published for such value as it may possess for field workers, graduate students, and professors of education by way of revealing centers of interest and trends in educational research. The information here presented may even make possible a type of integration or coördination in the graduate studies worked out in education. Such a list may suggest additional problems which should be investigated.

Titles of completed graduate theses in education may be found in the annual bibliography of educational research published by the United States Office of Education.

The name of the candidate, title of the thesis, graduate institution, and in most instances the name of the major adviser are given in the order named. The list does not differentiate between Ph.D. and Ed.D. problems.

The topical index for this year, due to limitations of space and to the fact that approximately one-half of the studies reported under way at present were listed as in progress in either the January, 1932, or January, 1931, number of the *Journal of Educational Research*, covers only the studies dealing with the various school subjects. Theses dealing with other problems may be located by scanning the list. Some titles are classified under more than one heading in the index.

Those titles previously listed in 1932 and 1931 are not reported in this year's compilation. Therefore, the present list may be multiplied by two in order to secure an approximation of the total number of Doctors' studies now under way in education in this country, making about eight hundred titles.

The schools which have coöperated in this compilation by forwarding thesis titles are: California, Catholic University, Cincinnati, Colorado State Teachers College, University of Colorado, Columbia, Cornell, George Washington, Harvard, Illinois, Indiana, Iowa, Johns Hopkins, Kansas, Kentucky, Michigan, Missouri, New York, Northwestern, Ohio, Oregon, Peabody, Pennsylvania, Pennsylvania State College, Pittsburgh, Southern California, Stanford, Temple, Texas, Virginia, West Virginia, Wisconsin, and Yale.

Inasmuch as about one-half of the Doctors' theses now under way were reported either one or two years ago, many of the comments made in the January, 1932, number of the *Journal* are still applicable, but cannot be repeated here. Brief comments may be made concerning activity in investigating problems pertaining to subjects of instruction in the school. The number of new studies reported last year in each of the school subjects is compared in Table I with those

included for the first time in the present list.

TABLE I

EDUCATION DOCTORAL THESES UNDER WAY IN THE SCHOOL SUBJECTS, 1932-33

Field	1932-33	1931-32
Art	1	0
Commercial and Business Education	9	10
English, Reading, and Language	24	22
Foreign Languages	1	2
Home Economics	5	2
Manual, Industrial, Vocational, and Agricultural Arts	18	21
Mathematics and Arithmetic	19	12
Moral, Religious, Personality, and Character Education	31	52
Music	8	3
Physical and Health Education	19	31
Science	14	9
Social Studies	14	19
Total	163	183

The tabulation indicates that in most of the fields of instruction doctoral studies have been continued to about the same extent as last year with the exception of rather marked decreases in religious and character education, and physical and health education. Somewhat more activity is apparent in music education, although it may be only an increase due to chance. In the case of such fields as art, foreign languages, home economics, and music, workers interested in teaching these subjects evidently do not take their advanced degrees in education, but in other divisions of the university, or if enrolled in schools of education are not working on Doctors' problems in their respective fields. It will be recognized that in view of the various types of university organization of graduate work it is difficult to secure an accurate picture of the number of students and graduate studies interested in and concerned with the teaching of the school subjects. For example, in one university religious education is in the school of education, while in another institution it is in a different division of the graduate organization. The titles here reported are limited to those forwarded by graduate schools and departments of education.

PARTIAL TOPICAL INDEX

Art.—361.*

Commercial and Business Education.—50, 71, 94, 126, 166, 264, 277, 285, 371.

English, Reading, and Language.—3, 23, 76, 83, 108, 133, 139, 146, 187, 189, 198, 201, 213, 239, 263, 285, 292, 295, 301, 310, 331, 355, 366, 371.

Foreign Languages.—32.

Home Economics.—22, 59, 190, 349, 392.

Manual, Industrial, Vocational, and Agricultural Arts.—5, 66, 74, 100, 128, 129, 156, 158, 167, 237, 247, 249, 266, 305, 307, 376, 387, 397.

Mathematics and Arithmetic.—26, 42, 84, 85, 99, 171, 173, 181, 215, 227, 246, 260, 265, 268, 293, 300, 321, 358, 381.

Moral, Religious, Personality, and Character Education.—8, 18, 19, 87, 88, 89, 91, 93, 109, 112, 119, 123, 125, 162, 165, 169, 180, 194, 197, 230, 231, 250, 277, 280, 299, 330, 353, 372, 375, 379, 383.

Music.—57, 116, 161, 185, 191, 312, 340, 359.

Physical and Health Education.—27, 72, 78, 117, 118, 157, 159, 160, 169, 172, 179, 209, 255, 279, 315, 318, 327, 360, 382.

Science.—10, 22, 37, 102, 113, 141, 144, 164, 193, 220, 243, 309, 355, 357.

Social Studies.—15, 44, 55, 82, 97, 131, 142, 149, 217, 290, 322, 365, 370, 374.

NEW 1932-33 LIST

1. Ackley, Clarence. "Enabling Acts for the Establishment of State School Systems." Pittsburgh. Rohrbach.

*Refers to item 361 in the list of theses.

2. Adams, Elwood. "The Use of the School Library by Teachers and Pupils in American Junior and Senior High Schools." Southern California. Weersing.
3. Ale, Ida G. "An Experiment in Children's Reading: Classroom and Individual Tests in Logical Memory." New York.
4. Allen, Tracy T. "An Analysis of the Facilities in Approved Teacher Preparation Institutions in Pennsylvania as to Aims and Purposes, Teaching Staff, Curriculums, and Practice Teaching." New York.
5. Anderson, Clarence S. "An Analysis of Pre-Employment Activities and Records of Men Qualifying to Teach Vocational Agriculture." Cornell. Stewart.
6. Anibal, Earle W. "The Financial Administration of Organized Campus Activities in Publicly Supported Teachers Colleges and Normal Schools." Columbia. Evenden.
7. Anthony, Cloyd. "Some Phases of Articulation between High School and University." Indiana. Patty.
8. Armentrout, J. S. "A Study of the Effectiveness of Certain Presbyterian Colleges in Developing Leadership, Lay and Professional, for Religious Education in the Church and Other Christian Enterprises." Yale. Weigle.
9. Armstrong, Noble B. "Teacher Accounting Records for Large Cities." Peabody.
10. Arnold, Herbert J. "The Evaluation and Organization of Material Available for Geologic Field Work in the New York City Region." Columbia. Powers.
11. Arnspiger, Varney C. "Talking Pictures in Education." Columbia. Strayer.
12. Bailey, Dwight L. "A Study of Selected Factors in the Social Background and Educational Achievement of Rural Elementary School Children in Western Illinois." Columbia. Dunn.
13. Bair, Frederick H. "The Superintendent of Schools as a Social Agent." Columbia. Engelhardt.
14. Baker, Paul E. "Methods of Race Adjustment between White and Colored Americans." Columbia. Elliott.
15. Balcomb, Mary F. "What High School Students Should Know about One Hundred Historical Persons." Colorado State Teachers College. Rugg.
16. Ballard, C. R. "The Development of Educational Experimentation in the United States." University of Colorado.
17. Barker, Lincoln. "A System of 'Visible Records' for the College Registrar's Office." New York.
18. Barker, M. Elizabeth. "The Relation of Personality Adjustments of Teachers to Their Efficiency in Teaching." Columbia. Symonds.
19. Bartlett, Edward R. "Measurable Moral and Religious Outcomes of Week Day Religious Instruction." Northwestern. McKibben.
20. Bechtel, Helen. "A Study of the Clinical Case-Method in Education." Yale. May.
21. Belcher, G. L. "The Public School Debt of Kentucky." Peabody.
22. Bell, Viola M. "A Study of Service Chemistry Used in Food and Nutrition Courses on the College Level." Ohio State. Charters.
23. Bennett, Chester C. "Background and Interests of Children Having Difficulty in Reading in the Primary Grades." Columbia. Gates.

24. Bernard, Ted B. "Secondary Education under Different Types of District Organization." Columbia. Kefauver.
25. Black, George H. "The State and the Education of Teachers." New York.
26. Blair, Robert V. "The Problem Method of Teaching Algebra." Peabody.
27. Blake, William H. "A Preliminary Study of the Interpretation of Various Positions of the Body." Columbia. McDowell.
28. Blank, Irene R. "A Critical Evaluation of Certain Aspects of the Doctrine of Mastery in Education." Pittsburgh. Harris.
29. Bliss, J. E. "The Wishes of Children." Ohio State. Goddard.
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